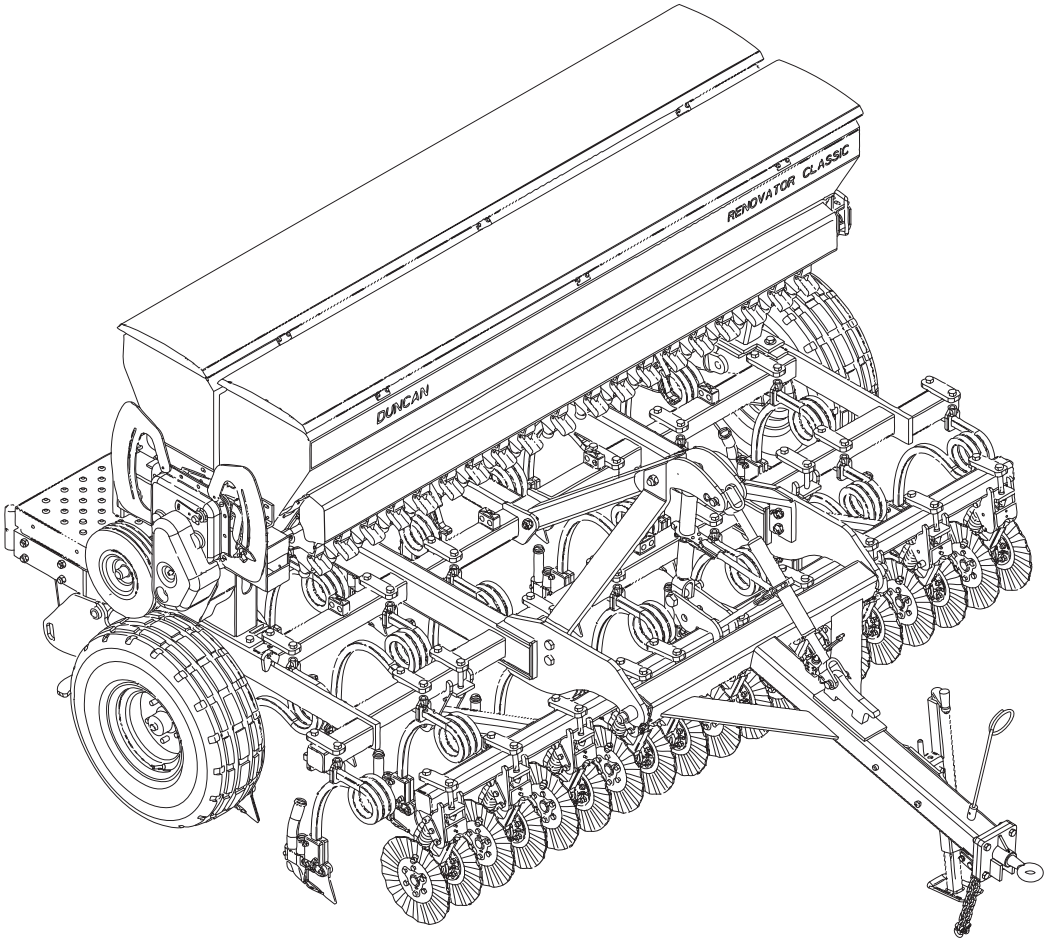
Owners Manual

Renovator Classic
ORIGINAL INSTRUCTIONS



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Pt. No. 67388
Issue 1210

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Introduction

Acquisition & Warranty

On delivery of your new Duncan Renovator Classic please check that the machine is not damaged. In cases of shipping damage, please ask your dealer to arrange for the appropriate claim to be lodged immediately. Assemble any parts supplied loose and inspect your machine with the aid of this manual to familiarise yourself with its features. If you have any queries ask your dealer straight away. The machine is covered by our 12 month warranty on faulty parts, subject to normal use.

Record below the serial number of your machine and keep it in a secure place to help trace the machine and assist us when you order parts.

Model: .....
Serial No: .....
Owner: .....
.....
.....
Delivery Date: .....
Dealer: .....
.....
.....

This Document contains the Original Operating Instructions for this machine and are verified by the Manufacturer,

Signed:.....

Product Development Manager

The Owner's Manual

Your new Duncan Renovator Classic will give long and efficient service if given normal care and operated properly.

This owner's manual is provided so that you can become thoroughly familiar with the design of the machine and to furnish information on correct operation, adjustment and maintenance. **Only persons well acquainted with these guidelines should be allowed to use the equipment.**

A separate illustrated parts section has been provided so that if any parts are required your dealer will be able to supply them by reference to part numbers.

The manual is considered as part of your machine and must remain with the machine when it is sold.

Right and left hand references in this manual are determined by standing behind the machine and facing in the direction of travel.

Disclaimer

Every effort has been made to ensure that the information in this manual was accurate and up to date at the time of going to press. Clough Agriculture reserves the right to make subsequent changes to the machine, where necessary, without notification.

The Company will not be responsible for any damage or consequential loss arising out of misinterpretation or failure to follow recommended procedures. Nor will it be liable for any damage caused by or arising out of modification or misuse of its product.

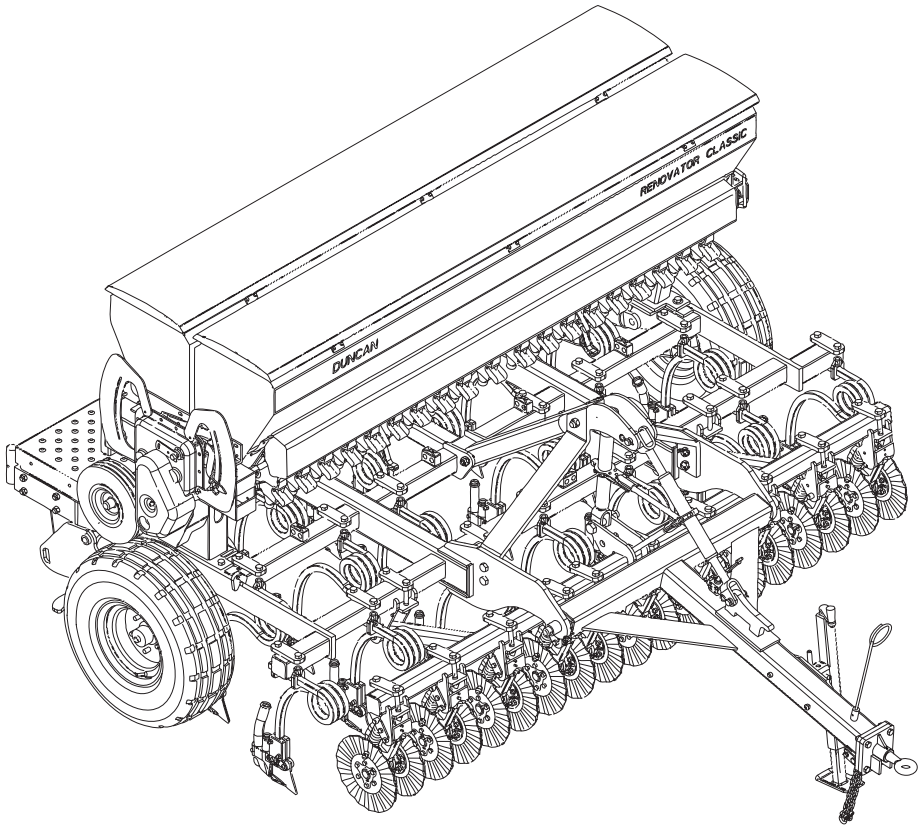
The owner has a responsibility to protect himself and others by observing all safety information and by ensuring all operators are well acquainted with the safety information, trained in the correct use of the machine and applying safe work practices.

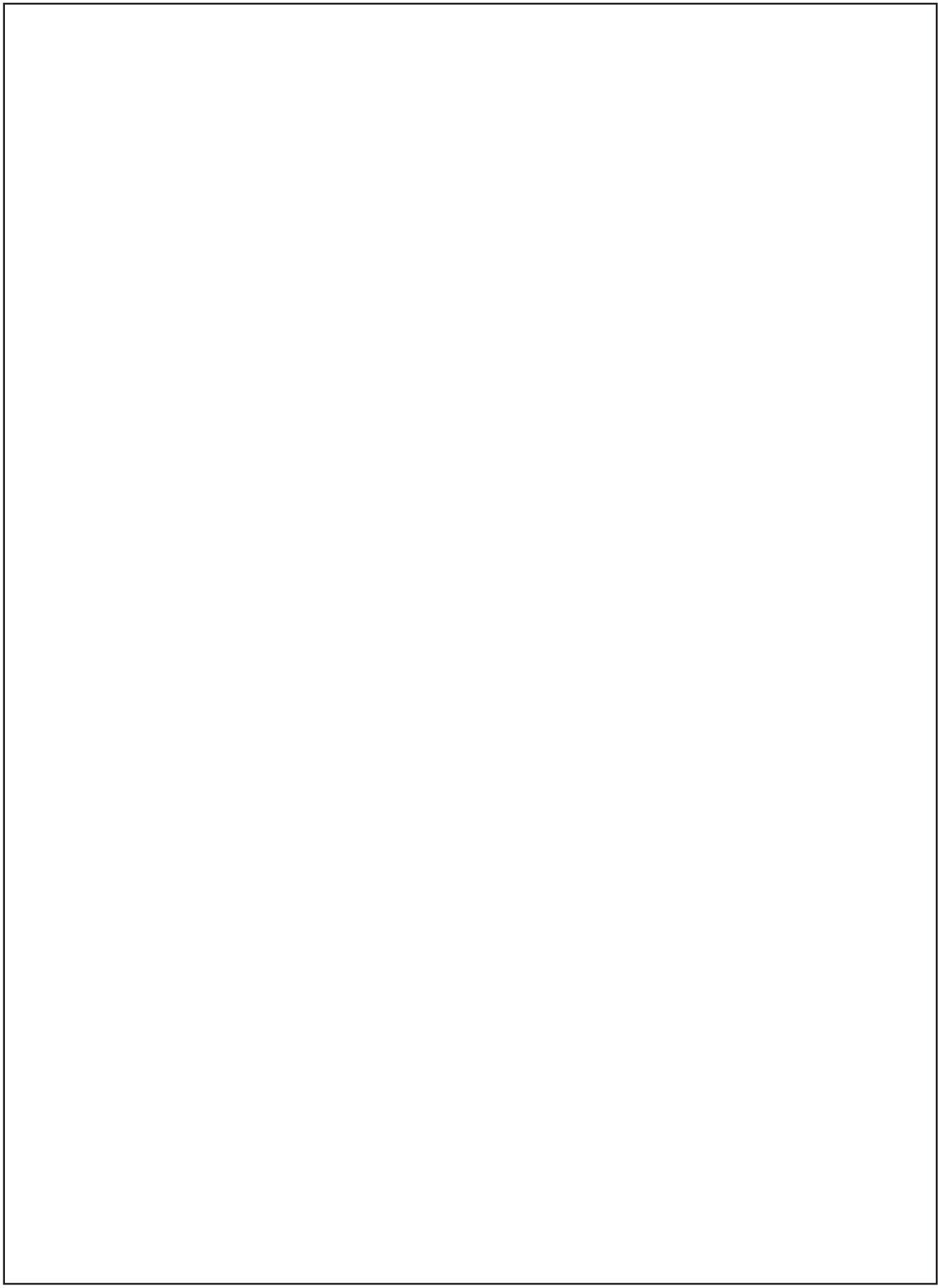
Description of Machine

The Duncan 'Renovator Classic' is a Coil Tine Tee-boot drill. The box is mounted on a robust frame accommodating large diameter tyres for the arable situation. The ground engaging components are controlled by a hydraulic ram and rocker arm system, giving ample control on ground pressure, good transport clearance and contour following ability. Sowing depth is controlled by adjusting the hydraulic ram as required. The quality European type peg roller seeder system handles all seeds from turnip and rape through to peas and maize. The seeders are driven from the groundwheels via a jockey wheel system and variable speed gearbox. For transport the drive is easily disconnected by raising the drill to its transport height.

Working Principle

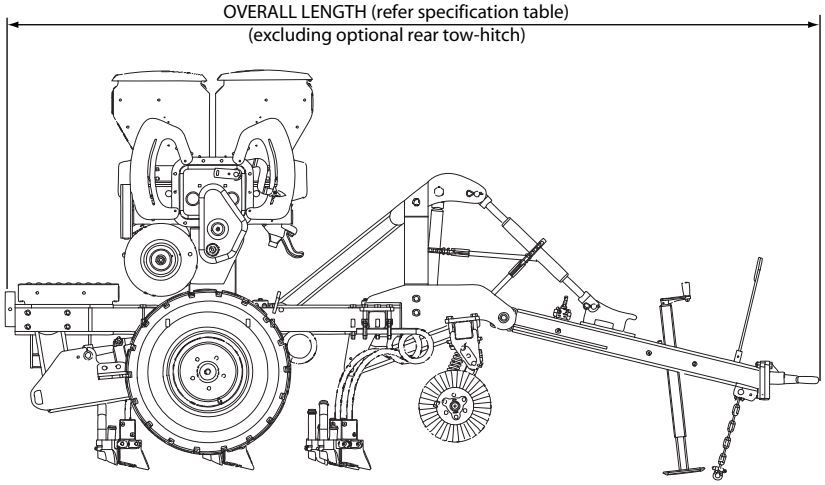
The gearbox, pegged seed rollers and seeder flaps are set to give the desired seed rate. The coil tyne and tee-boot, create the seed bed. Seed flows down the flexible tubes between seeder and tee-boot units, and drops into the prepared seed bed.

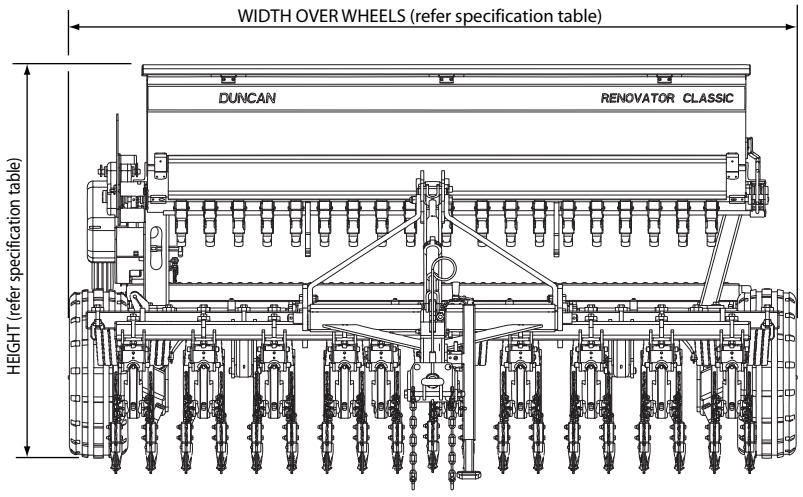




Dimensions & Capacities

Dimensions & Capacities	
Width (over wheels /mm)	3026
Height (Groundwheels up /mm)	1700
Height (Groundwheels down /mm)	2035
Overall Length (mm)	3512
Weight inc. disc openers (unladen)	1610
Tyre Size	10/80/12
Recommended Tyre Pressure	4 Bar (58psi)
Maximum speed (km/hr)	40 km/hr
Jockey Tyre Size	410/350 x 6 x 4 ply
Jockey Tyre Pressure	3.44 Bar (50 psi)
Row Spacing	147.5
Effective Sowing Width	2802.5
Box Capacity (litres per box)	350
Maximum Tractor HP Rating	180





! ATTENTION

On the machine important safety information is indicated by these symbols.
These highlight general safety aspects in regard to the machine rather than specific hazards.

Do not ride or allow passengers on the machine.
Under no circumstances are passengers to be permitted on the machine while it is in operation or being transported. Any footboards and/or footsteps are provided solely for the purpose of preparing the machine for use.

Keep clothing and body extremities well clear of pinch points while the machine is operating (seeding or calibrating). Keep well clear of moving parts at all times.
These signs typically occur wherever trapping points exist. These include drive chains, sprockets, shafts, wheels, discs, pivot points, etc. Guards are provided with the machine for safety reasons (where practical without compromising machine performance). Ensure these are always fitted during operation.

Always exercise extreme caution in the vicinity of sharp edges and points.
Where possible guards are provided with the machine for safety reasons (where practical without compromising machine performance). Ensure these are always fitted during operation.

Footboards, footsteps, drawbars and other machine surfaces may be slippery when wet.
Apply extra caution in wet conditions and in the early morning when surfaces are wet.

Keep Clear. (It is dangerous to be in this area when the machine is operating.)

SAFETY - General

N.B. Throughout this manual important safety information is indicated by these symbols in the margin:

A prohibition should be observed under all circumstances.

A warning indicates a hazard that could cause death or injury if the warning is ignored.

A caution indicates a hazard that may cause damage to property if the caution is ignored.

This section of the manual offers general guidelines for the safe operation of machinery. It does not replace local safety regulations. These guidelines were current at the time of publication, but may be superseded by later regulations.

Clough Agriculture has made every effort to highlight all risks to personnel or property. Owners and operators have a responsibility to exercise care and safe work practices at all times in the vicinity of the machine.

Owners are advised to keep up to date on safety issues and to communicate these to all users of the machine.

Contact the Occupational Safety and Health Service (OSH) for further information about general safety aspects. If you have safety concerns specifically related to this machine, contact your dealer immediately.

Operator Safety

Read this manual carefully before operating new equipment. Learn how to use this machine safely.
Be thoroughly familiar with the controls and the proper use of the equipment before using it.

Take careful note of all safety instructions both in this manual and on the machine itself. Failure to comply with instructions could result in personal injury and/or damage to the machine.

Replace missing or damaged safety signs on the machine and ensure that these remain clearly visible.

It is the owner's responsibility to ensure that anyone who operates, adjusts, lubricates, maintains, cleans or uses the machine in any way has had suitable instruction and is familiar with the information in this manual (particularly with regard to safety aspects).

Operators and other users of the machine should be aware of potential hazards and operating limitations.

Be Prepared for Emergencies

Keep a first aid kit and fire extinguisher handy.

Keep emergency numbers for doctors, ambulance, hospital and fire department near your telephone.

SAFETY - General (Continued)

WARNING

Appropriate Dress

Wear close fitting clothing and avoid rings or other forms of jewellery which could become caught in the machinery.

People with long hair must have it securely fixed and confined close to the head.

Refer to local safety standards for protective clothing and recommended safety equipment.

WARNING

Transport This Machine Safely

Ensure that all linkage pins and security clips are fitted correctly. With trailing machines tow with the drawbar only, as this is the only safe towing point on the machine.

Always check that bystanders (especially children) are well clear (front and rear) before starting and moving the tractor and the machine.

Plan safe routes of travel, and be aware of power lines and other roadside hazards. Take particular care when towing implements on hillsides.

Do not ride or allow passengers on the machine.

This machine is not designed to carry passengers, and no riders are permitted.

Road transport

On public roads,

- A speed of 30km/h must not be exceeded.
- Do not operate during the hours of darkness unless standard lights are fitted and clearly visible. (This also applies when visibility is limited, e.g., in foggy conditions.)

See the guidelines in the *Vehicle Dimensions and Mass Rule*, issued by the Land & Transport Safety Authority.

Avoid tip-overs

Avoid holes, ditches and obstructions which may cause the machine to tip over, especially on hillsides. Never drive near the edge of a gully or steep embankment - it might cave in. Slow down for hillsides, rough ground and sharp turns.

SAFETY - General (Continued)

Handle Agricultural Chemicals Safely

All farm chemicals should be stored, used, handled and disposed of safely and in accordance with the supplier's/ manufacturer's recommendations.

Read the product label before using, noting any warnings or special cautions, including any protective clothing or equipment that may be required, ie. respirtor.

Do not eat or smoke while handling sprays, fertilisers, coated seeds, etc. Afterwards, always wash your hands and face before you eat, drink, smoke, or use the toilet.

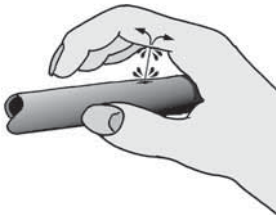
Store sprays, fertilisers, coated seeds, etc. out of reach of children and pets, and away from food and animal feeds.

Any symptoms of illness during or after using chemicals should be treated according to the supplier's/manufacturer's recommendations. If severe, **call a physician or get the patient to hospital immediately**. Keep the container and/or label for reference.

Avoid High Pressure Fluids

Avoid any contact with fluids leaking under pressure, because the fluids can penetrate the skin surface.

Any fluid which penetrates the skin, will need to be **removed immediately by a medical expert.** Seek specialist advice on this type of injury.



Relieve the pressure before disconnecting any hydraulic or other lines. Make all repairs and tighten all fittings before re-connection to pressurised fluid.

Keep your hands and body away from any pinholes or high pressure jets. Search for leaks with a piece of cardboard instead of using your hand directly.

Safe Work Practices

All farm machinery is potentially dangerous and should be treated with caution and respect.

Before starting the machine, ensure that all controls are placed in neutral and that bystanders are well clear. Check that the guards have been securely fitted and that any adjustments have been made correctly.

Where possible, disconnect or isolate the drive mechanism to the implement. Lower the machine onto the ground when not in use.

SAFETY - General (Continued)

WARNING

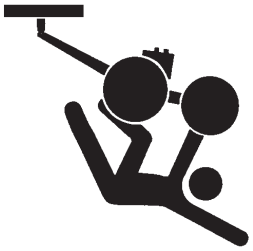
Practise Safe Maintenance

Keep the machine in safe working condition. Routine maintenance and regular servicing will help reduce risks and prolong the life of the machine.

General Maintenance

Accidents occur most frequently during servicing and repair. The following general rules must be followed when maintaining or working with machinery:

- All operating and maintenance manuals must be read before and referred to while using or servicing any piece ofequipment.
- Turn off all machinery power sources and isolate the machine before making adjustments, doing lubrication, repairs or any other maintenance on the machine.
- Ensure that the machine hydraulics are disconnected from the power source.
- Wear gloves when handling components with cutting edges, such as any ground cutting components.
- Beware of hazards created by springs under tension or compression when dismantling or maintaining the machine.
- It is recommended that you clean the machine with a water blaster or similar apparatus before commencing maintenance.



Make Sure the Machine is Well Supported

When machinery is fitted with hydraulics, do not rely on the hydraulics to support the machine. During maintenance or while making adjustments under the machine, always lock the hydraulics and support the machine securely. Place blocks or other stable supports under elevated parts before working on these.

Electrical Maintenance

Disconnect the electrical supply from the tractor before doing any electrical maintenance.

CAUTION

Welding

With electronic equipment in modern tractors it is advisable to disconnect the machine from the tractor, or at least disconnect the alternator and battery before attempting any welding.

CAUTION

Use Only Genuine Spare Parts

Unauthorised modifications or non-genuine spare parts may be hazardous and impair the safe operation and working life of the machine.

Excess lubricants must be disposed of safely so as not to become a hazard.

SAFETY - Machine Specific

This section of the manual gives specific guidelines for the safe operation of the Renovator Classic.
These guidelines were current at the time of publication, but may be superseded by later circumstances. They do not necessarily cover every possible hazard and must be read in conjunction with the **SAFETY - General** section (Page 4 - 8).

Hazard Points on the Renovator Classic

The lists below are not all-inclusive and serve only to highlight the more obvious areas of risk.

The decals attached to the machine are a general reminder that there are hazardous areas on the machine, rather than specifically highlighting all possible hazards.
For decal locations on machine, refer Page 11.

No Ride
Passengers are not permitted anywhere on the machine.

Pinch Points/Moving Parts
Hazardous areas include:
- Drive chains.
- Sprockets between the drive wheel, the transfer shaft and the gearbox (RH side).
- Sprockets between the gearbox and the box shafts (RH side).
- Agitator drive units (LH side).
- Agitator shaft inside the boxes.
- Seeder units, box shaft and shaft connectors.
- Wheel legs and main frame assemblies
- Between discs and other sub-assembly parts (where fitted).
- Press wheel assemblies (where fitted).

Slippery When Wet
Hazardous areas include:
- Footboards and footstep.
- All smooth surfaces on the frame structure.

Keep Clear
Hazardous areas include:
- Between the tractor and Renovator Classic.
- Immediately adjacent to the Renovator Classic side.

SAFETY - Machine Specific (Continued)

Hazard Points on the Renovator Classic (Continued)

Pedestal Chain Guards

To prevent hands, etc. getting caught in drive chains, guards are provided to cover sprockets, chain and chain tensioners mounted about the drive pedestal (RHS). These guards must be fitted while using the machine.

Warning: Access to pinch points is still possible from underneath the guard.

For guard locations on machine, refer Page 13.

Calibrating

Be particularly careful when calibrating the seeding rate. At this time, the calibration trays have been removed and are no longer covering the rotating seeder units. See **Pinch Points/ Moving Parts** (Page 11) for hazardous areas.

Transport

The two wheels located at the sides of the machine are for the purpose of controlling sowing depth. These are also used to support the machine weight during transport (while linked to the tractor).

Important - Refer to safety cautions in the **Transport** section, page 14 of the manual. Ensure that all linkage pins and security clips are fitted correctly.

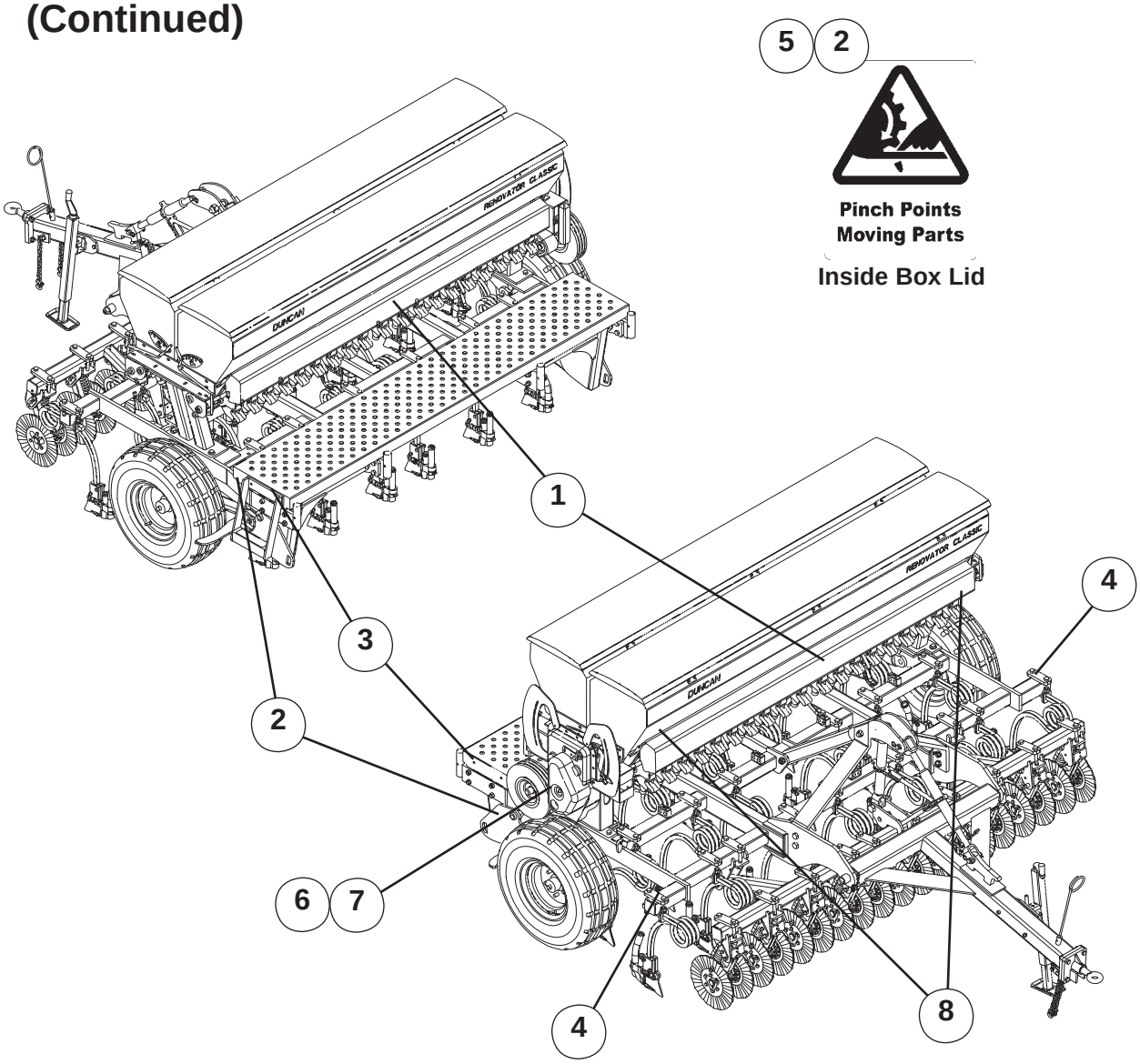
Maintenance

Refer Page 28 for reference to the **Maintenance and Care** section of the manual.

Lubrication

Refer Page 29 for reference to the **Maintenance and Care** section of the manual.

SAFETY - Machine Specific (Continued)



Item	Decal/Guard	Pt. No.	Qty
1	'No Ride'	43900	3
2	'Pinch Point/Moving Parts'	43901	5
3	'Slippery When Wet'	43902	2
4	'Keep Clear'	43904	2
5	Arrows (Inside Box Lid)	43905	4
6	Pedestal Drive Guard	25995	1
7	Jockey Drive Swing Guard	25745	1
8	'30 km/hr'	43911	2

Transport

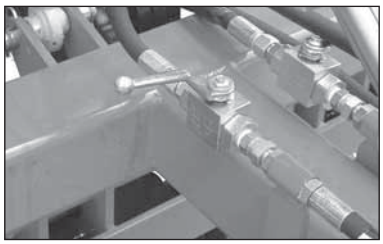


Fig 1

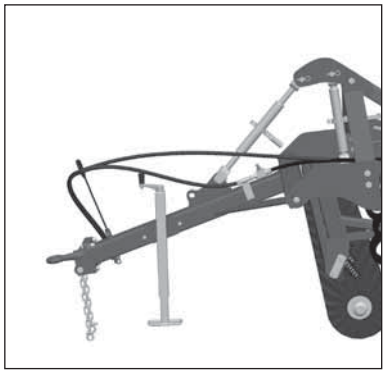


Fig 2

Fig 3

1 Raise the drill into the transport position and hold at the full extent of the rams for a few seconds to allow cylinders to rephase/equalise.

CAUTION

2 **Important** - To avoid machine damage due to drill lowering during transport, always close the hydraulic valve on the drawbar. Move the handle to a position at 90^0 to the hydraulic line as shown in Fig 1. This applies to the drawbar and disc opener hydraulic valves where fitted.

3 Locate jack stand in transport position, if fitted. Refer Fig 2.

4 Ensure lighting and oversize warning requirements meet recommendations published by the local Land Transport Authority or equivalent.

CAUTION

5 **Maximum towing speed 30 km/hr**.
For countries other than New Zeaand greater speed restrictions may apply, please refer to your local transport authority.

Ensure towing vehicle requirements are adequate for the towed vehicle e.g. mass, brakes. Refer to recommendations published by the local Land Transport Authority or equivalent.

Braking when towing can cause the load to jackknife. Use extra care when towing in adverse conditions such as mud, inclines and sharp bends.

Lower towing speeds are recommmended on farm roads/ tracks and where one wheel is on or over a road verge.

WARNING

6 **Attach safety chains to tractor.** Refer Fig 3. Safety chains must be crossed over underneath the coupling and attached to the towing vehicle. The attachment points must be as close as practical to the towing coupling and one each side.The towbar on the towing vehicle must be rated for the towed mass. **Do not remove or replace the safety chains provided with any other than those specified in the parts manual.**
Note: The safety chains are provided with sufficient length to cater for all towing vehicles. Safety chains must be shortened by cutting off excess length so that if the coupling fails the drawbar will not hit the ground.

7 If the machine is fitted with row markers or other vertical extensions, check clearance under power lines en route.

CAUTION

8 **Important -** For greater disc opener ground clearance, adjust the ram or turnbuckle on the disc opener unit so they are at maximum height, and/or extend the drawbar ram or turnbuckle to level the machine chassis.

Operation

General Operation Guidelines

1 Use a sufficiently powerful tractor which is heavy enough to tow the drill safely.

2 Operate the drill at a speed of 6-12 km/hr (4-8 mph). In stoney and uneven ground conditions a lower speed is more appropriate

3 Check that the drill is level during calibration and while seeding.

4 Check tyre pressure before seeding. Refer page 3.

5 Double check seed rates before seeding.

6 Raise the drill out of the ground when making any turns.

7 Raise the drill out of the ground before backing up.

8 After prolonged storage, check to see that all drive mechanisms and hydraulic equipment are functioning correctly. Check that the seed tubes are not perished or blocked.

Sowing Speed

Typical travel speeds when sowing range from 6-12 km/hr in good conditions. In stoney and uneven ground conditions a lower speed is recommended to minimise rapid part deterioration. Sowing too fast can result in:

1 Poor contour following and uneven sowing depth.

2 Impact damage to:

- **a** Ground engaging components.
- **b** Bearings, housings & axles.
- **c** Fasteners & structural components.

3 More extreme conditions will result in greater vibration and uneven seed flow at low seeding rates.

Sowing Depth Control

The sowing depth is dependent on:

1 The wheel height in relation to the chassis

2 Tyre pressure

3 Ground condition i.e. hard or soft

The wheel height in relation to the chassis is controlled using the threaded depth adjustment collar (1) Refer Fig 4.

Caution: Do not over extend the thread depth adjustment collar. Additional collars may be required.

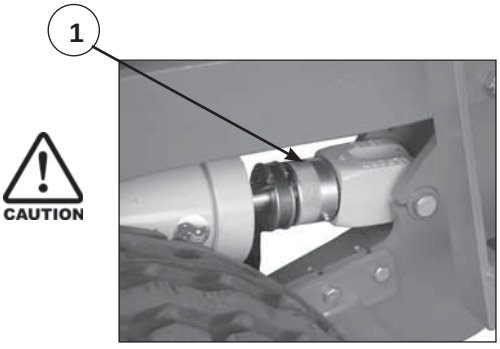


Fig 4

Level Drill

Use the drawbar turnbuckle or ram to tilt the drill so it is sitting level. An adjustment may be required after a short period of use because the paint wears off the discs and the discs sharpen which in turn improves the penetration abilities.

Transport Position

When in the transport position the hydraulic cylinders are fully extended. In this position the cylinders fully equalise by allowing oil to bypass the master cylinder piston. It is recommended to raise the drill into the transport position when turning at headlands or regularly to counteract the effects of oil leakage past the piston and ensure cylinder rods are equally extended and minimise variations in sowing depth.

Coulter Penetration Depth

To create the ideal seed bed the disc opener coulter should cut approximately 20mm below the inverted tee point. In hard and dry conditions this may not be achievable, and better machine/sowing performance may be achieved without using the disc openers. An indication of this will be the machine bouncing which will result in uneven sowing depth.

Coulters will give better penetration ability as they sharpen with use.

Renovator Classic Sowing Chart

High & Low Ratio - Row Spacing 147.5

Table 3

Test Seed Type/ Thousand Seed Wgt., TSW*(gm)	Gear Ratio*	Shutter Slide*	Bottom Flap*	Metering Wheel*	Seed Rate (kg/ha) Gearbox Setting Position										Hints
	H/L	Position		Type	15	20	30	40	50	60	70	80	90	100	
Wheat (41.2)	H	3/4	3	N					102.14	128.78	152.36	180.03	208.25	234.35	
Oats (37.2)	H	Full	3	N					98.98	122.97	146.37	171.74	196.99	219.56	
Barley (45.7)	H	Full	3	N					117.66	144.97	176.33	205.4	236.51	266.22	
Ryecorn (25.8)	H	3/4	3	N					118.96	148.03	178.5	207.32	240.85	270.94	
White Peas (302)	H	3/4	3	N			111.97	161.93	213.44	246.59	305.11	358.66	397.42	457.22	Agitator Stopped
Green Peas (240)	H	3/4	3	N			77.62	116.89	156.06	192.65	230.78	272.72	316.2	355.73	
Peren. Grass (2.27)	H	Full	3	N	6.53	13.73	27.41	40.90	53.86	67.23	81.51				
Annual Grass (4.4)	H	Full	3	N	8.06	16.32	31.75	46.31	60.67	76.68					
Pasture Mix* (-)	H	Full	3	N		13.92	27.59	41.31	54.42	67.38	81.65				
Lucerne (3.17)	H	3/4	1	F			9.27	13.82	17.97	22.43	26.38				Agitator Stopped
Turnip (2.17)	L	3/4	1	F	0.96	1.76	3.21	4.63	6.0						Agitator Stopped
Kale (3.20)	L	3/4	1	F		1.69	3.21	4.66	6.02						Agitator Stopped
Swedes (3.25)	L	3/4	1	F	0.94	1.65									Agitator Stopped
Rape (3.50)	L	3/4	1	F		1.62	3.0	4.44	5.78						Agitator Stopped
White Clover (1.11)	L	3/4	1	F	0.82	1.57	3.06	4.47	5.65						Agitator Stopped
Red Clover (2.23)	L	3/4	1	F		1.90	3.56	5.05	6.66	8.17	9.75				Agitator Stopped
Super Phosphate	H	Full	3	N			91.51	140.12	185.26	235.37	286.62	344.51	397.16	456.96	
DAP Granules	H	Full	3	N					174.04	214.2	256.66	301.67	346.42	382.88	
Super Phosphate	L	Full	3	N				53.7	71.0	90.24	109.84	132.03	152.25	182.99	
DAP Granules	L	Full	3	N								115.64	132.81	146.77	

Gear Ratio*: **H, High = 21T on Transfer Shaft, 13T on Gearbox Input Shaft.**
L, Low = 13T on Transfer Shaft, 21T on Gearbox Input Shaft.

Shutter Slide*: **For Grain, changing the Shutter Slide from 3/4 to Full gives 10% to 15% more flow.**

Pasture Mix*: **Test Mixture = 72% Perennial Grass, 8% White Clover, 8% Cocksfoot, 8% Concord, 4% Red Clover**

Bottom Flap*: **The values shown were the optimum test settings, decreasing the gap may cause seed damage, too large a gap will give intermittent flow rates. (Flaps are spring loaded to cope with small variations in seed/granule size).**

Metering Wheel*: **N = Normal Metering Wheel**
F = Fine Seed Metering Wheel

TSW*: $\frac{\text{TSW(gm) x Desired Plants/m}^2}{\text{Germination \%}} = \text{Sowing Rate (Kg/Ha)}$

Notes

1. Where a small seeds box is used, multiply the above seed rates by **0.80** to account for the different gearing ratio.

2. Seed rates shown are approximate only for the respective gearbox setting. It is recommended that the calibration procedure is always used. Refer to page 18.

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Basic Calibration Procedure

Gearbox Setting Lever

To set the seed rate at the gearbox, slacken the star knob (1) by turning counter-clockwise and push from below into the position indicated in the Sowing Chart. Retighten the star knob firmly (Fig 6).

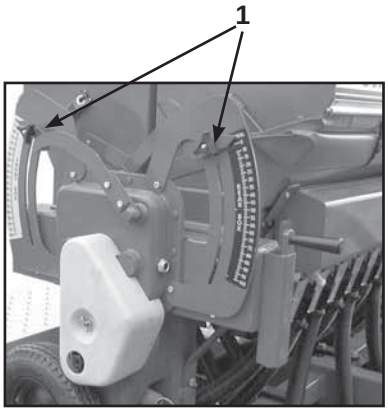


Fig 6

Important

The settings shown in the Sowing Charts (kg/ha) can only serve as reference values. Deviations may occur caused by differences in the size, shape, density of the grain and by the dressing agent. **Therefore prior to any sowing, always carry out calibration trials to accurately determine the actual seed rate.**

Using the stepless variable speed gearbox, the speed of the metering shaft and thus the seed rate is set steplessly. The higher the figure indicated on the scale by the setting lever the greater the seed rate (Fig 6).

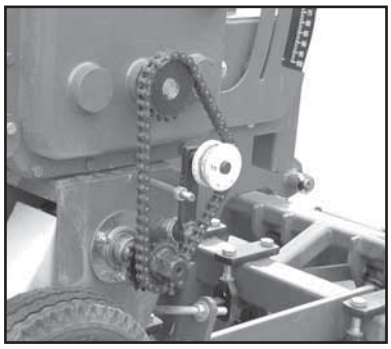


Fig 7

Selecting the Gear Ratio

The Seed Drill is designed with a two speed (high and low) gear ratio arrangement where the moving of the chain from a 21 x 13 teeth ratio to a 13 x 21 teeth ratio changes the output from high to low (Fig 7). The selection and method for changing the ratio is detailed under Speed Setting Page 23.

Setting Seeder Shutter Slides

The varying flow properties of seeds require different shutter slide positions which may be found in the Sowing Chart for the individual type of seed. This corresponds to one of the three settings in Fig 8.

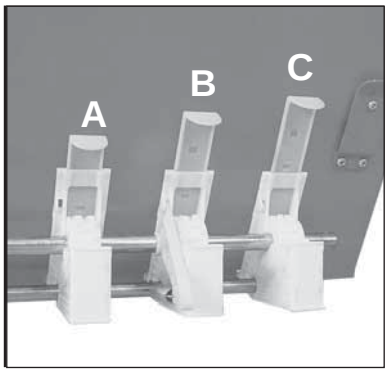


Fig 8

Fig 8/A	Fig 8/B	Fig 8/C
Closed	3/4 Open	Fully Open

Table 4

Bottom Flap Settings

The various seed sizes require matching bottom flap clearances below the metering wheel. The adjusting plate allows for 10 different settings. The required position for the seed type may be found in the Sowing Chart. The control levers are located on the LH end of the seedbox, (opposite end to the gearbox).

Number “1” corresponds to the minimum (closed) position and “10” the maximum gap (Fig 9).

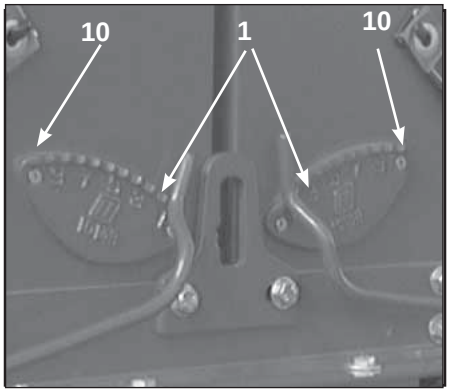


Fig 9

Basic Calibration Procedure (Continued)

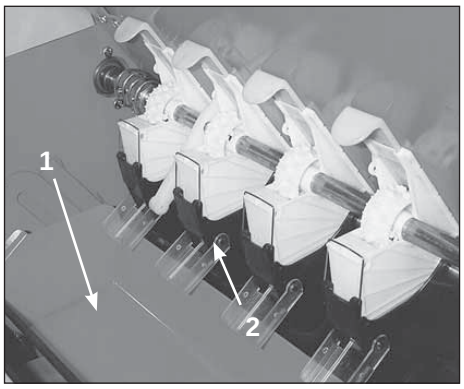


Fig 10

Fig 11

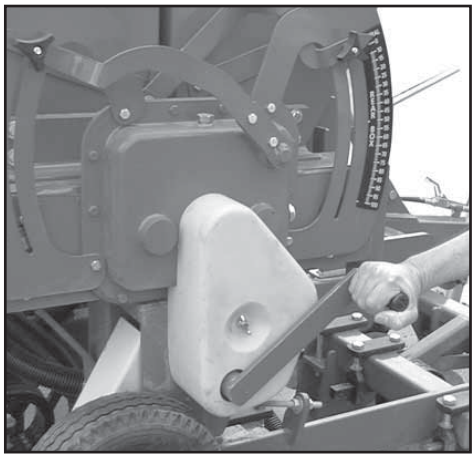


Fig 12

Seed Calibration

The calibration test should be done to confirm the required seed rate and is done with the drill stationary and level.

Seed Calibration Procedures

1 Remove the calibration tray from the storage brackets on the seedbox. Place the calibration tray (1) on the support members below the seeders (Fig 10).

2 Position all the clear plastic seed diverters (2) to redirect the seed into the calibration tray (Fig 10).

3 Make sure all the shutters are open and set to the position indicated in the seed charts for the particular seed (Table 3. Page 17).

4 Agitator Shaft - Check the Seed Chart “Hints” (Table 3) whether to connect or disconnect the shaft by removing the lynch pins (1) during seeding (Fig 11).

5 For the test, half fill the box with seed. If this is not possible make sure the seed is evenly distributed within the box.

6 For setting method refer to Basic Calibration Procedures (Page 18).

Note For seeds which are not covered in the Sowing Chart (Page 17), use the figures for a seed of comparable size and shape.

7 Place the crank handle over the hexagonal drive dog on the transfer shaft and turn anti-clockwise until the seed flows consistently from the seeders (Fig 12). To ensure complete filling of the seed unit continue turning the crank until the calibration tray is approximately half full then empty into the seedbox. The drill is now ready for calibration.

8 Turn the crank handle anti-clockwise the required number of revolutions as detailed in Table 5.

Note The Calibration is usually done for 1/40th hectare. For very small seed rates or when using inaccurate scales (i.e. unable to measure to the nearest gram) the calculation based on 1/10th hectare should be used.

Scales must be accurate to 2 grams as any error will be multiplied by either 10 or 40 giving inaccurate calibration results.

Basic Calibration Procedure (Continued)

Hand Crank Turns for Seed Rate Calibration

The tables represented below are for arable conditions (**worked ground**) and are calculated to indicate an average situation. If there is any doubt as to the accuracy of these figures for the conditions, it is advisable to run checks on the calibration figures listed. Refer Page 22, (**Wheel Slip Deviations**). Check and record which tyres are fitted to your drill, to ensure use of the correct Hand Crank Turn and Constant figures.

Machine Size	Row Spacing(mm)	Sowing Width (m)	Turns for 1/40 Hectare	Turns for 1/10 Hectare
19 Run	147.5	2.8	32.5	130

9 Weigh the seed collected during the test in kilograms.

Caution: Scales must be accurate to 2 grams, as any error will be multiplied by either 10 or 40, giving inaccurate calibration results.

10 Calculate the seed rate by multiplying the kgs previously collected x 40 (1/40th ha method, refer Table 6) or x 10 (1/10th ha method, refer Table 7) depending on the requirement. If the resultant calculation does not produce the desired seed rate use the enclosed seed rate calculator disc to determine the correct gearbox setting.

Refer **Use of Seed Rate Calculator** Page 21.

Suggestion: To be on the safe side and until confidence has been gained with the method of calibration it is advisable to conduct a second test at the newly determined gearbox setting.

11 Where a coated seed is used it is advisable to check the calibration after 1 hectare as dressings can tend to create a coating on the seed metering wheels thus changing the the flowing properties of the seed which in turn alters the seed rate.

For $^{1}/_{40}$ Hectare (250m^2) Calibration
Seed Rate = Actual Seed Collected (kg) x 40

Table 6

For $^{1}/_{10}$ Hectare (1000m^2) Calibration
Seed Rate = Actual Seed Collected (kg) x 10

Table 7

Basic Calibration Procedure (Continued)

Use of Seed Rate Calculator

Determining the gear box scale setting using the calculator.

Usually the first calibration test yields a different seed rate. However with the value determined from the first test it is possible to determine the correct gearbox setting with the aid of the enclosed disc calculator (Fig 13). The disc calculator consists of 3 scales. An outer white scale (1) for all seed rates above 30 kg/ha and an inner scale (2) for all seed rates below 30 kg/ha. On the middle coloured scale (3) are all the gearbox setting numbers to a maximum value of 100.

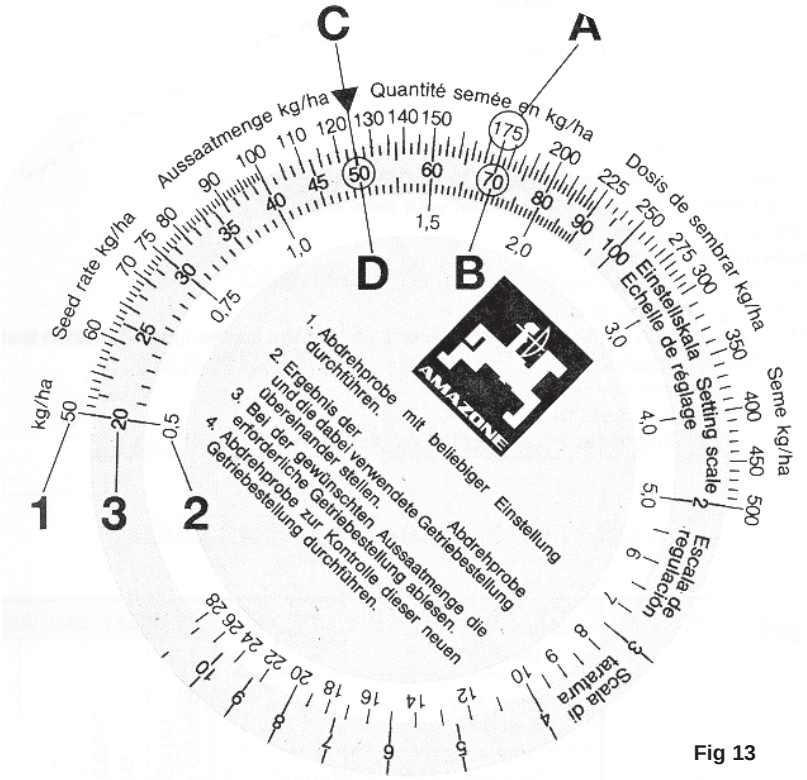


Fig 13

Setting Example (Desired Seed Rate 125kg/ha)

1 From the calibration procedure at a gearbox lever setting of “70”, a seed rate of 175 kg/ha is obtained.

2 Turn the inner disc until the measured seed rate of 175kg/ha (A) is in line with the related actual gearbox setting of “70”(B) (Fig 13).

3 Read off from the disc rule the necessary gearbox setting for the required seed rate of 125kg/ha (C). In this example the correct setting is “50” (D) (Fig 13).

4 To be on the safe side the new gearbox setting can be checked by another calibration test.

Basic Calibration Procedure (Continued)

Calibration Deviations

Deviations Between the Calibration Test and the Actual Seed Rate

The most frequent cause for changes between the calibration test and the seed rate lies in the flowing properties of seed during sowing. These changes in properties generally result from reactions of the dressing agents to temperature, humidity or abrasion. These changes will become even more obvious when the bottom flaps are incorrectly set. If the setting of these flaps leaves too large a gap an uncontrollable additional flow of seed can occur during seeding; especially when assisted by the drill bouncing, a condition not simulated while conducting the calibration tests. For this reason the basic setting of the bottom flaps should be checked at regular intervals.

Residues from the seed dressing on the bottom flaps and metering wheels can also influence the flowing properties of the seed and thus the seed rate. In such cases a balance will occur only after a period of time and it is recommended to repeat the calibration test to confirm the seed rate after 2-3 seedbox fillings, nominally when the seed box is half empty. Only then will a balance occur and the seed rate will stabilise.

Wheel Slip Deviations

It is always possible with rubber tyred drills in extreme ground conditions to get wheel slip. Not normally a problem with cleated type tyres in good condition, but more so in the arable situation with the less agressive tread patterns. The result: large differences between the calibration test and the actual sowing rate, obviously less seed deposited than required. The number of crank turns indicated below is correct in most circumstances other than those mentioned above.

To check number of crank turns for calibration

Should you require to check this in a practical way proceed as follows:

For an area of 250m^2 (1/40 Hectare), the travel distance for your machine is shown below. Place the crank handle over the hexagonal drive dog on the gearbox. Move the machine forward over the measured distance, counting the number of turns of the crank handle as you go. Using this number of crank turns repeat the calibration.

Machine Size	Travel Distance (m)	Turns for 1/40 Hectare	Sowing Width (m)
19 Run	89.2	32.5	2.8

Hints for Sowing with Variable Speed Gearbox

The gearbox allows for stepless changes in the speed of the metering shaft and thus the seed rates. Due to the variations in seed type and application rates there are two speed ranges available.
By changing from High Speed to Low Speed the range of settings and control is dramatically increased.
Change to the Low Speed when the gearbox setting is down to 10 on the scale and the desired seed rate cannot be obtained.
To change the speed setting from high to low, remove the wing nut (1) and chain cover.(2) (Fig 14).
Release the tension on the chain (1) by forcing back the chain tensioner (2) and hold in place with the crank handle. Refer Figure 15. Remove the chain from the 21 tooth output sprocket to the 13 tooth sprocket, then remove the chain from the 13 tooth gearbox sprocket to the 21 tooth. Check the chain is correctly aligned then release the chain tensioner. Ensure the tension roller is correctly aligned with the chain. Replace guard and calibrate as required.

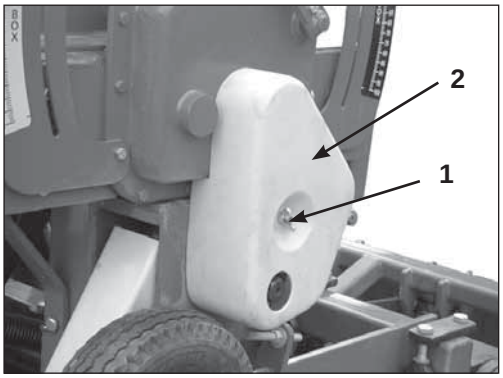


Fig 14

Low Speed Shown

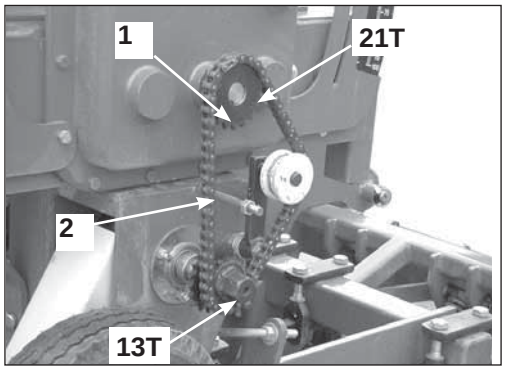


Fig 15

To Determine the Gearbox Setting after a Speed Change

For determining the correct gearbox setting after the speed change, conduct the first test at 50. With the weight of seed collected find your correct setting with the aid of the disc calculator, refer Page 19, Fig 13.

Sowing of Fine Seeds

For sowing fine seeds the Renovator Classic Drill is equipped as standard with a combined normal and fine seed “Elite” metering wheel (1). During grain sowing and other larger varieties of seed both the normal and fine seed metering wheels are coupled and both rotate. In order to convert the seed drill to sow fine seed insert the crank handle and rotate clockwise until the holes (2) of the fine seed wheel are visible (Fig 16)
Using the tool supplied (1) disengage the the pin inside the hole so that the normal metering wheel rotates freely on the metering shaft (Fig 17).
At this time it would be advisable to close any shutter slides not required for the fine seed sowing.
When seed is to be sown again using the normal metering wheel press the pin, from the normal metering wheel side (opposite direction to before), using the tool, back into the hole of the fine seed wheel thus reconnecting the drive between the two.

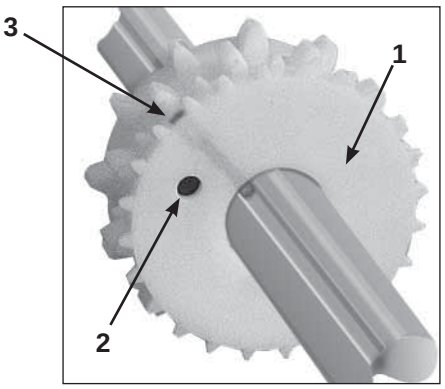


Fig 16

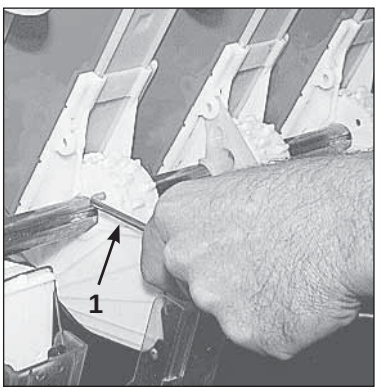
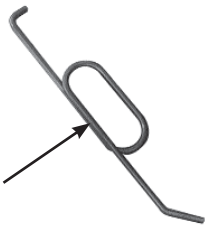


Fig 17



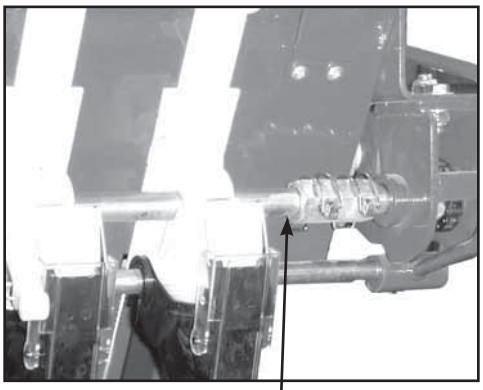


Fig 18

Small Seeds

Calibration with Disconnected Agitator Shaft

The fine seed metering wheel used in Duncan Drills is especially well suited for sowing small seeds such as rape. Due to the intensive action caused by the agitator the seeds can adhere to each other, or be damaged, causing irregular sowing/germination. **Therefore it is recommended that when sowing small seeds, especially oil seeds and thin shelled seeds, the drive to the agitator is disconnected.** To do this remove the lynch pin (1) (Fig 18).

Deviations between the calibrated and actual seed rate can occur when residual dressing agent sticks to the bottom flaps and thus slows the flow of seed. Before beginning the actual calibration test fill the calibration trays by turning the crank handle at a high speed around the 90 setting on the gearbox scale. This will cause an immediate buildup of the dresssing agent on the flaps. Return the contents of the calibration trays to the seed box and proceed with the actual calibration. Due to the residue buildup on the flaps your calibration will now reflect accurately the required seed rate. It is advisable with small seeds to use the 1/10 hectare method for your calibration, thus cutting down on weighing errors.

Note - Remember to reconnect the agitator shaft as required for other seeds otherwise the consistency of seed rate will be affected.

Fig 19

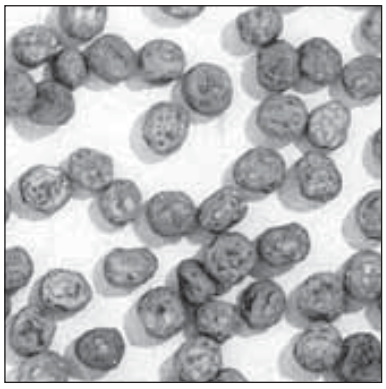


Fig 20

Sowing Peas

Peas having the size and shape as illustrated in Fig 19 (e.g. White Field Peas), can be sown without problems with all Clough Drills with this type of metering wheel.
The flap should be set to a gap of at least “3” on the flap setting lever (Page 16, Fig 9).
With these peas it should not be necessary to run the agitator shaft.

Peas having the size and shape as illustrated in Fig 20 (e.g. Green or Garden Peas), tend to bridge inside the seedbox and do not flow freely.
This multi-faceted pea requires agitation for sowing.

CAUTION

Caution - When resetting the metering wheels on the seeder shaft

Care should be taken when tightening the grub screws on the fine seed wheel (Page 23, Fig 16, item 3). Adjust the grubscrew until the movement of the metering wheel just stops, then tighten no more than 1/8 of a turn.
Do not overtighten as this can result in breakages while operating and may render the warranty on these units void.

(Optional) Hectaremeter Settings Setup

Refer to the operation instructions supplied with your hectaremeter kit for information and operation thereof. (Fig 21).

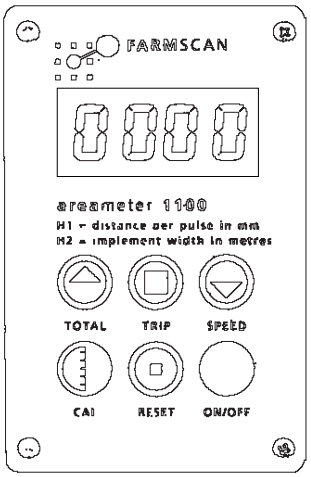


Fig 21

Computronics 1100 Area Meter Setup for Mk4 Renovator

The **H1** value is the **distance the machine travels in mm per pulse detected on the pedestal drive shaft.**

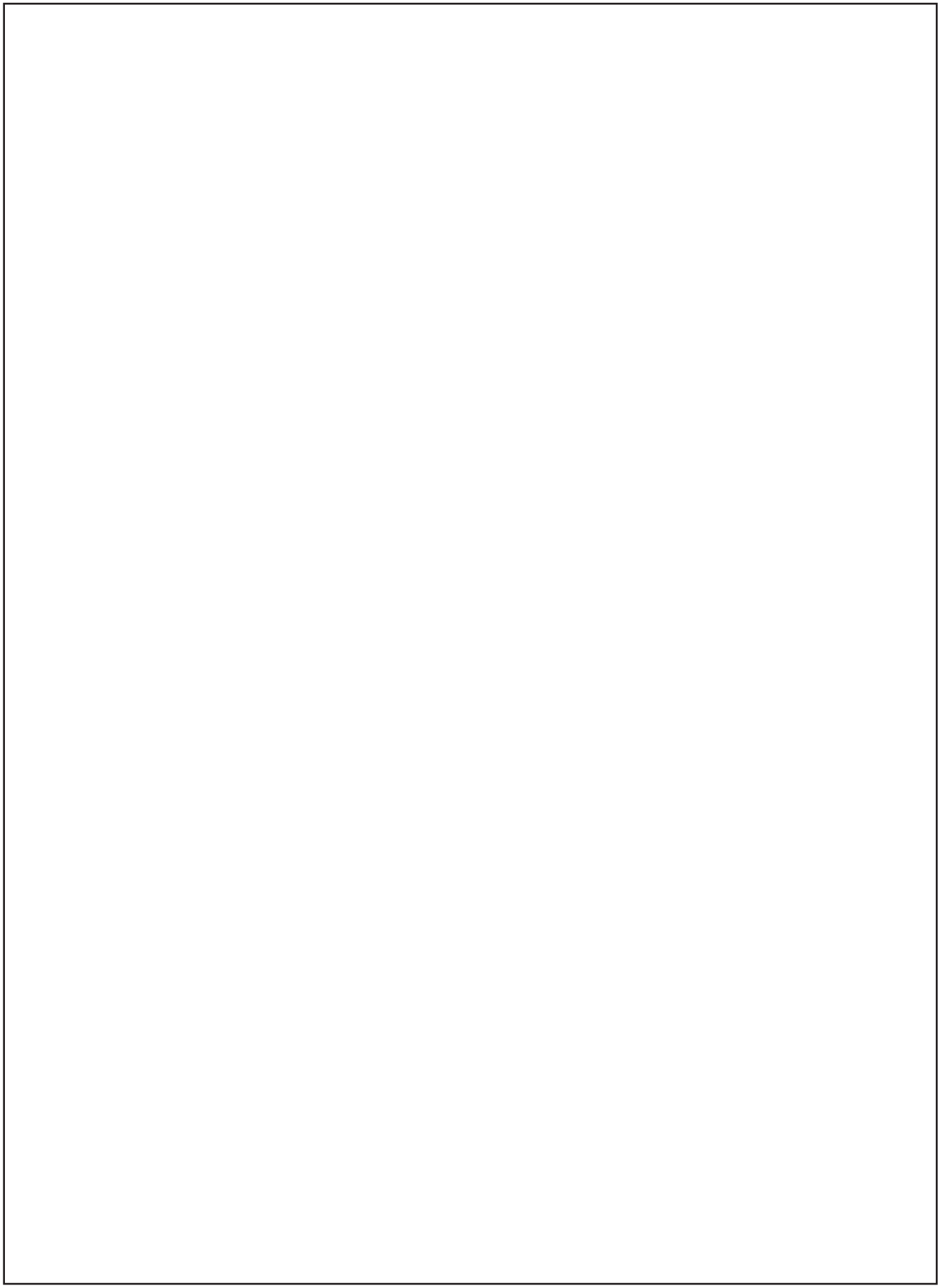
This is affected by:-
- jockey wheel diameter
- if there is wheel slip
- the gear ratio (13T on the jockey axle and 38T on the sensor mainshaft).

Ensure that the jockey wheel is inflated to the recommended pressure. (Page 5)

The **H2** value is calculated from the ***number of rows x row spacing*** (in metres)

Machine	Row	H1	H2
19 Run	147.5	2750	2.80
		H1	H2

It is advisable, as with all things electronic, to have a backup of your totals. We suggest you record these on a daily basis in a notebook or diary.



Renovator Classic Calibration Notes

Maintenance & Care

General Safety and Accident Prevention Advice

1. Make sure that if the tractor remains attached to the drill that the ignition key is removed.
2. During maintenance the drill should be supported in such a manner that if hydraulic failure was to occur the machine would still be adequately supported.
3. Wear gloves when handling components with cutting edges such as worn discs etc...
4. Disconnect the electrical supply from the tractor before doing any electrical maintenance.
5. Refer to safety sections for more safety information.

General Cautionary Maintenance Advice

1. **Electric Welding** - With the electronic equipment in modern tractors it is advisable to completely disconnect the implement from the tractor, or at the very least disconnect the alternator before attempting any welding.
2. **Hydraulics** - Ensure hydraulic couplings (male & female) are clean before connecting. Dirty couplings will result in hydraulic oil contamination and hydraulic cylinder seal damage and bore scores. This in turn will result in oil leakage past the piston seals.

   No filter is fitted to the hydraulic system. If hydraulic fittings and oil supply are not going to be kept clean it is recommended that a filter be fitted to prevent hydraulic cylinder damage.
3. **Water Blasting** - Water blasting, steam cleaning or other pressurised cleaning processes can force dirt etc. into undesirable places that may cause damage or rapid part wear to items such as bearings, seals, chains, bushes etc. Caution must be exercised.
4. Box set lifting eye profile - these profiles are are provided for easy removal of the dual boxes from the side frames. **Do not use when boxes are loaded nor to lift machine.**

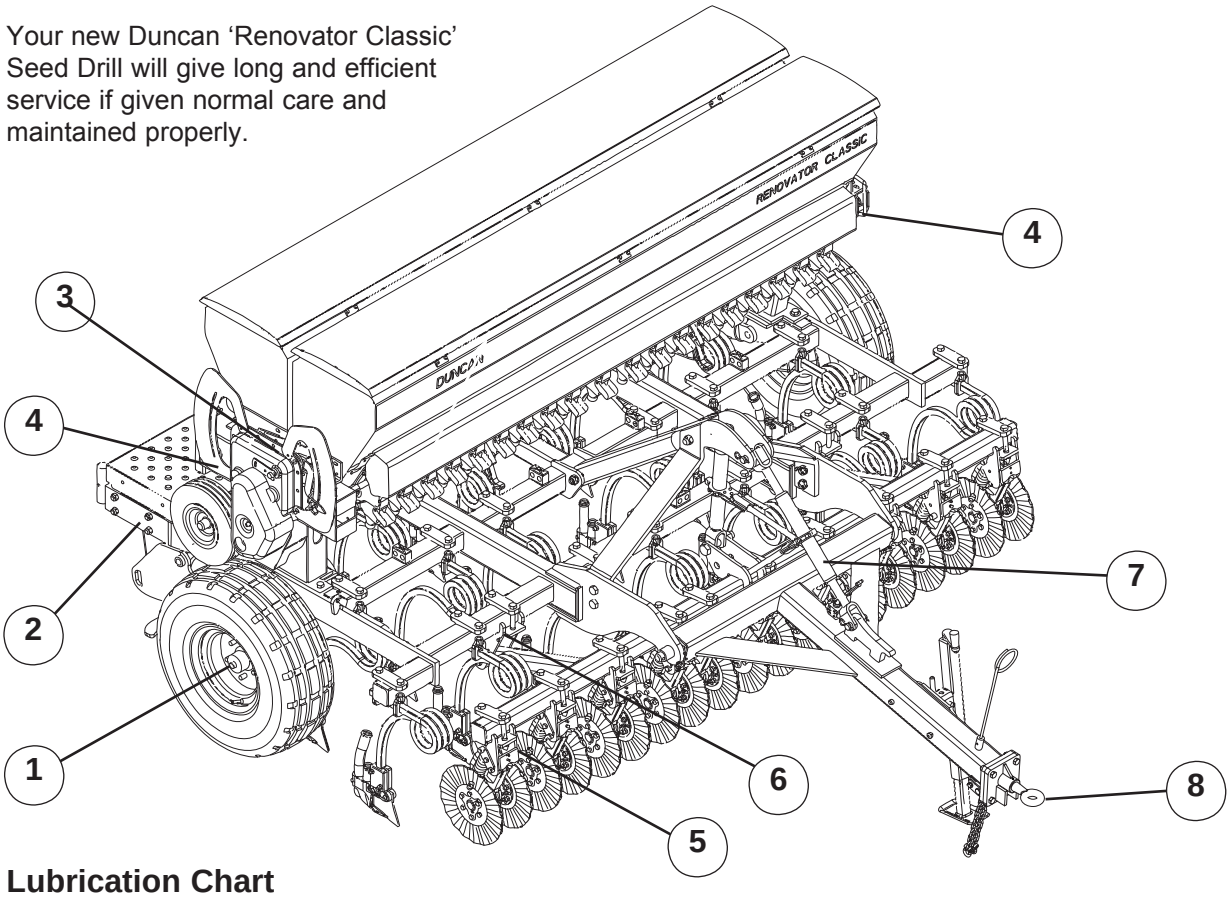
Maintenance & Care - Lubrication Instructions

Precautions with Grease

Greases should not be mixed as the structure may be weakened by the mixes of different types of thickener, which may cause softening and loss of grease from the bearings by running out.

CAUTION

Your new Duncan 'Renovator Classic' Seed Drill will give long and efficient service if given normal care and maintained properly.



Lubrication Chart

Item	Components	Lubricant	Frequency
1	Wheel Bearings	Castrol LMX Grease	Annually
2	Wheel Leg Pivots	Castrol LMX Grease	Weekly
3	Gearbox	Castrol Oil Agri Trans Plus	Maintain Level
4	Drive Chains	Suitable Roller Chain Lubricant	See Maintenance Schedule
5	Disc Arm Castings	Castrol LMX Grease	Daily
6	Disc Opener Fr. Pivots	Castrol LMX Grease	Monthly
7	Turnbuckles	Castrol LMX Grease	Monthly
8	Coupling	Castrol LMX Grease	Weekly

* The lubrication frequencies are only a guide. Actual frequency will be dependent on extent of use and ground conditions.

Maintenance & Care - Lubrication Instructions

Components	Daily (or after 20Ha)	Weekly (or after 75Ha)	Pre Season (or 500 Ha)
Disc Openers	●	●	●
Depth Adjustment Collar	●	●	●
Seeders/Agitators/Bottom Flaps	●	●	●
Wheel Nuts	●	●	●
Pivot Pin Fasteners		●	●
Coupling & Safety Chains		●	●
Roller Chains		●	●
Gearbox		●	●
Hydraulics (Oil Leaks)		●	●
Tyre Pressures		●	●
Bolted Connections			●

Maintenance Schedule

(Refer also to Summary Chart, above)

1 Bolted Connections

All bolted connections of the machine should be checked after the first 3 to 5 hours of operation and retightened if necessary and thereafter at regular intervals. It is suggested that this is done every 500 hectares or annually, whichever occurs first.

2 Gearbox

The oil level in the gearbox can be seen in the oil gauge window. Changing the gearbox oil is recommended once a year or sooner if the oil is discoloured. For refilling the oil remove the 1/2” BSP plug on the top face of the gearbox, Castrol Oil Agri Trans Plus or equivalent* should be used.
The total filling capacity is 1.25 litres.
DO NOT OVERFILL.

**Oil Specification to meet the requirements of : SAE 10W-30, API GL-4, Massey Ferguson M1143, John Deere J20C, J20D, Case MS 1207, Ford/New Holland M2C-134D, M2C-86 A/B/C*

3 Drive Chains

All drive chains (1) (Fig 25) should first be checked after every 20 hours of operation and thereafter weekly or after 75Ha of operation as follows:-
The metering wheels of the seed drill are driven via roller chains from the drive wheel.
Cleaning of the roller chains is recommended after long periods of operation. Remove the chain, wash in kerosene and then dip them in heated grease or oil or spray them with a suitable commercial roller chain lubricant.

4 Wheel Rocker Pivots

Wheel rocker pivots (4 per machine) must be greased regularly (weekly or after every 75Ha) to provide lubrication and flush out any dirt. Refer Fig 26 (1).

5. Depth Adjustment Collar

Grease the depth adjustment collar (1) regularly to ensure it does not seize up. Also check for dirt buildup around the ram shaft seals to ensure seal damage does not occur. Refer Fig 27

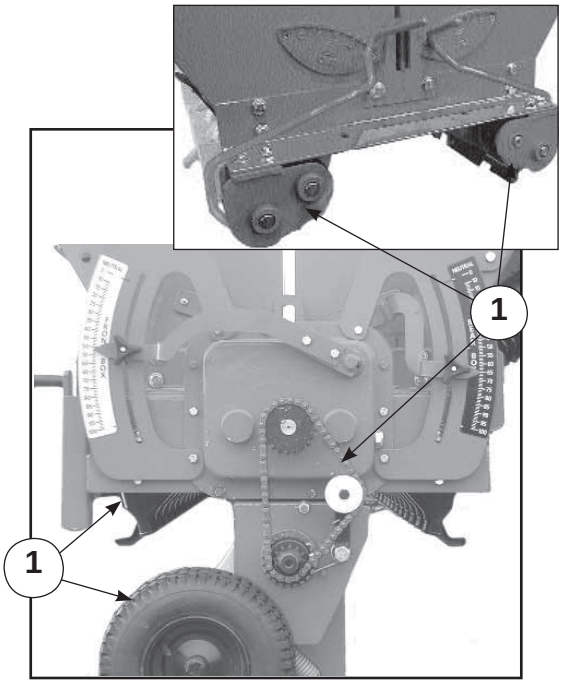


Fig 25

6. Tyre Pressure

Refer to Dimensions & Capacities Page 5. Check the tyre pressures regularly to ensure correct pressure is maintained. Weekly checks are recommended.

7. Disc Openers

Front coulter bearings are sealed and do not require lubrication. Check discs for any lateral movement (wobble) on a regular basis. Replace bearings if there is any noticeable wobble.

There is one grease nipple on each disc opener frame pivot and disc assembly casting. Frame pivots should be greased monthly while disc castings should be greased daily to provide lubrication and to flush out any dirt.

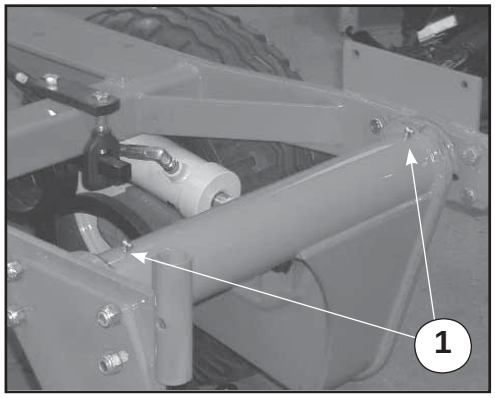


Fig 26

8. Length of Seed/Fertiliser Tubes

These tubes can stretch over a period of time and require checking at approximately six monthly intervals. Shorten if necessary to avoid bends which will restrict the flow of seed/fertiliser.

9 Framework

The framework structure should be inspected annually for defects, i.e., cracks in members or welded connections. The framework should be cleaned prior to the inspection.

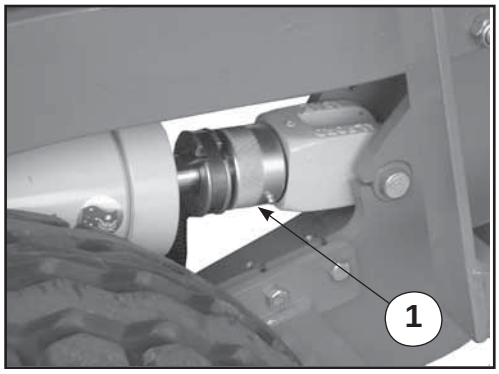


Fig 27

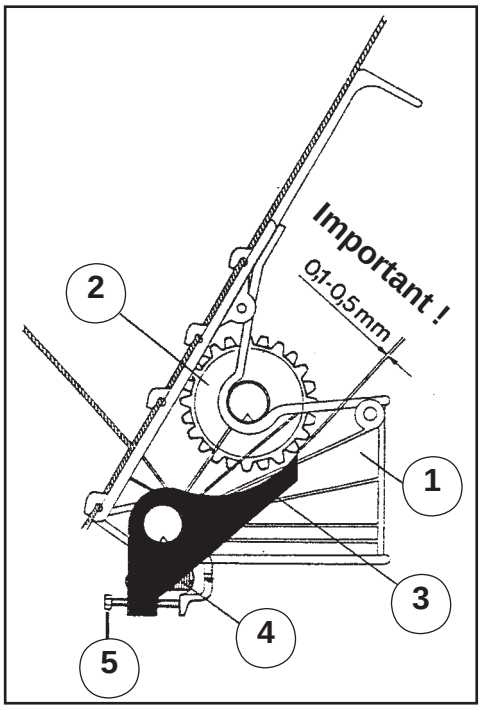


Fig 28

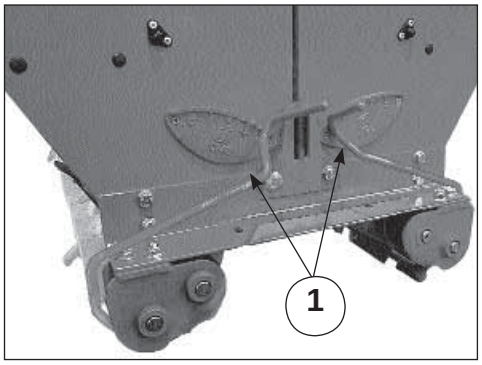


Fig 29

Maintenance & Care (Continued)

10 Bottom Flaps (Fig 28)

The required seed rate is controlled by both the metering wheels and the bottom flaps. The seed flows from the seed box into the metering wheel housings. Inside the metering wheel housing (1) the seed is caught between the metering wheel (2) and the bottom flap (3). The metered amount of seed is transported by the metering wheel to the edge of the bottom flap where it drops off into the seed guide tube which leads to the coulter. Varying grain sizes require the matching of the flap clearance to the different grain sizes. This matching is done by raising or lowering the bottom flaps by using the flap adjusting lever on the LH end of the seed box. If larger foreign particles, e.g. stones get between the metering wheel and the bottom flap, the bottom flap can give way downwards. A strong return spring (4) brings the bottom flap immediately back into the working position.

The metering system should be checked every 1/2 year or before any sowing period with an empty seed box and empty metering housings.

Use the following procedure:
Put the bottom flap setting levers (1) (located on the LH end of the seed boxes) in position “1” for the front box and position “1” for the rear box. Refer Fig 29.
By turning the metering wheel shaft by hand check the flaps are all set to a gap of 0.1 to 0.5mm (refer Fig 28).
To adjust individual flaps use the spring tensioning screw (5) (Fig 28).

Note: Maintenance Schedule (page 30)
Where the frequency is given in terms of use (eg. weekly) or area covered (eg. 75 Ha) perform the maintenance task based on whichever occurs first.

Preparing the Machine for Storage.

Locate on a dry level surface. The machine should be stored wherever possible so the rams are not supporting any weight. The drive chains should be lubricated with suitable roller chain lubricant before prolonged periods of storage.

For longer term storage remove seed/fertiliser tubes from the boot assembly and allow to hang without deformation. Check tube lengths when replacing.

It is recommended that maintenance be carried out at the end of the season, giving sufficient time to obtain spare parts and/or carry out repairs if required.

Renovator Classic Troubleshooting

Problem	Possible Cause	Action	Refer to Page…
Over Sowing	Jockey wheel under inflated	*Check pressure*	5
	Are the hectare meter settings correct?	*Check settings*	25
	Has the calibration procedure been followed correctly?	*Re-calibrate*	18-22
	Is the shutter slide open too wide?		18-22
	Is the flap setting open too wide?	*Check settings*	18-22
	Too larger gap between seeder unit & bottom flap (should be 0.3mm when on setting 1)	*Check settings*	32
	Quadrant Tri-knob coming loose	*Check gap*	18
Under Sowing	Has the calibration procedure been followed correctly?	*Re-calibrate*	18-22
	Is the correct gear ratio selected?	*Check setting*	18, 23
	Sowing at shallow depths. Is there sufficient pressure on the jockey wheel?	*Check and adjust spring pressure*	
Drill not sowing until quadrant levers are well down on the scale/each box is sowing at different rate even when both set on the same setting	The two bolts on the quadrant lever have come loose	*Check and reset*	53
	Transfers may not be aligned with each other		
Drill sowing deeper on one side/leaking down on one side	Hydraulic lift rams have not rephased properly	*Rephase rams*	34
	Dirt in the poppet valve of the ram	*Clean/replace valve*	34
Tines are moving	Too much turning with drill in the ground	*Keep turning to minimum*	
Drill not penetrating into ground/drill riding out of ground	Operating drill in the float position	*Do not operate in float*	15
	Disc openers are keeping the drill from penetrating into the ground	*Lift discs out of the ground*	16

Commisioning PTE Phasing Cylinders

1. General

(a) PTE cylinders will re-phase in both directions. Each piston is fitted with 2 poppet valves which open at the end of the stroke to allow oil to bypass the piston. The bypass of oil at the end of the stroke allows for initial bleeding of the system and re-phasing in operation.

(b) The valve in the piston is a precision device, **CLEANLINESS IS OF THE UTMOST IMPORTANCE.** Contamination in the oil will accelerate deterioration of the valve seat. Cylinders will creep once the integrity of the seating is lost.

2. Bleeding the System

(a) Initial bleeding after connection to the tractor
Purge all air from the system by fully stroking rams in both directions. Allow the oil to flow through the cylinders with the tractor at an idle for a minimum of 2 minutes at each end of the stroke.

(b) Re-phasing after initial bleeding
After initial bleeding the cylinders will only require occasional re-phasing during operation. This is done by extending the rams for about 30 seconds or until all cylinders have reached the end of their stroke.

3. Fault Finding

1. Cylinders creeping during operation
There are two primary causes of this:
(i) Air in the hydraulic system
(ii) By passing of the poppet valve.

(a) Check that there is no air in the system. Raise and lower the machine. All cylinders should move instantaneously, any lag indicates that there is air in the system. Other signs of air in the system are hoses vibrating/squealing or the control handle shuddering. Re-bleed the system if necessary.

(b) If there is no sign of air in the system and the cylinders still creep, raise the machine off the depth stop and measure the movement of each cylinder rod.

(c) If both cylinders move at the same rate it is likely to be the control valve/lock out valve that is leaking.

(d) If the slave continues moving after the master cylinder has hit the depth stop it is likely to be the piston in the master cylinder that is bypassing.

(e) If the slave cylinder extends while the master cylinder retracts it is likely to the the piston in the master cylinder that is bypassing.

(f) If the master cylinder does not move but the slave does it is likely to be the piston in the slave cylinder that is bypassing.

(g) If the piston is bypassing it is likely to be contamination in the phasing valve. The cylinder will have to be dismantled, cleaned and fitted with a new poppet valve.

Commisioning PTE Phasing Cylinders (continued)

3. Fault Finding (continued)

2. Cylinders moving at different rates

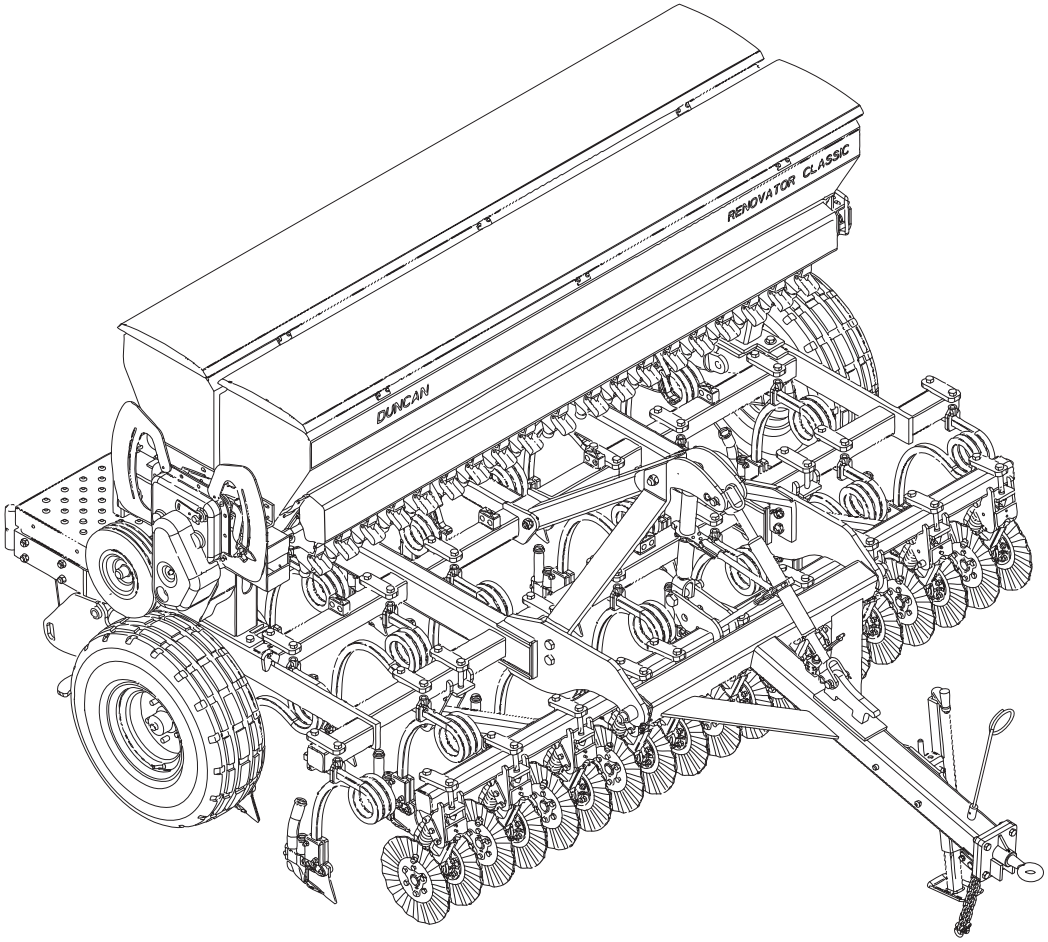
(a) Check that there is no air in the system. Raise and lower the machine; all cylinders should move at the same time, any lag indicates that there is air in the system. Re-bleed the system if necessary.

(b) Ensure that the cylinders have been connected correctly. The cylinders should be connected in series so that the bore sizes go down in 1/4” increments. The Rod end port of the master cylinder (3.5” bore) is connected to the piston end port of the slave cylinder (3.25” bore).

Renovator Classic Maintenance Notes

Parts List

‘Renovator Classic’



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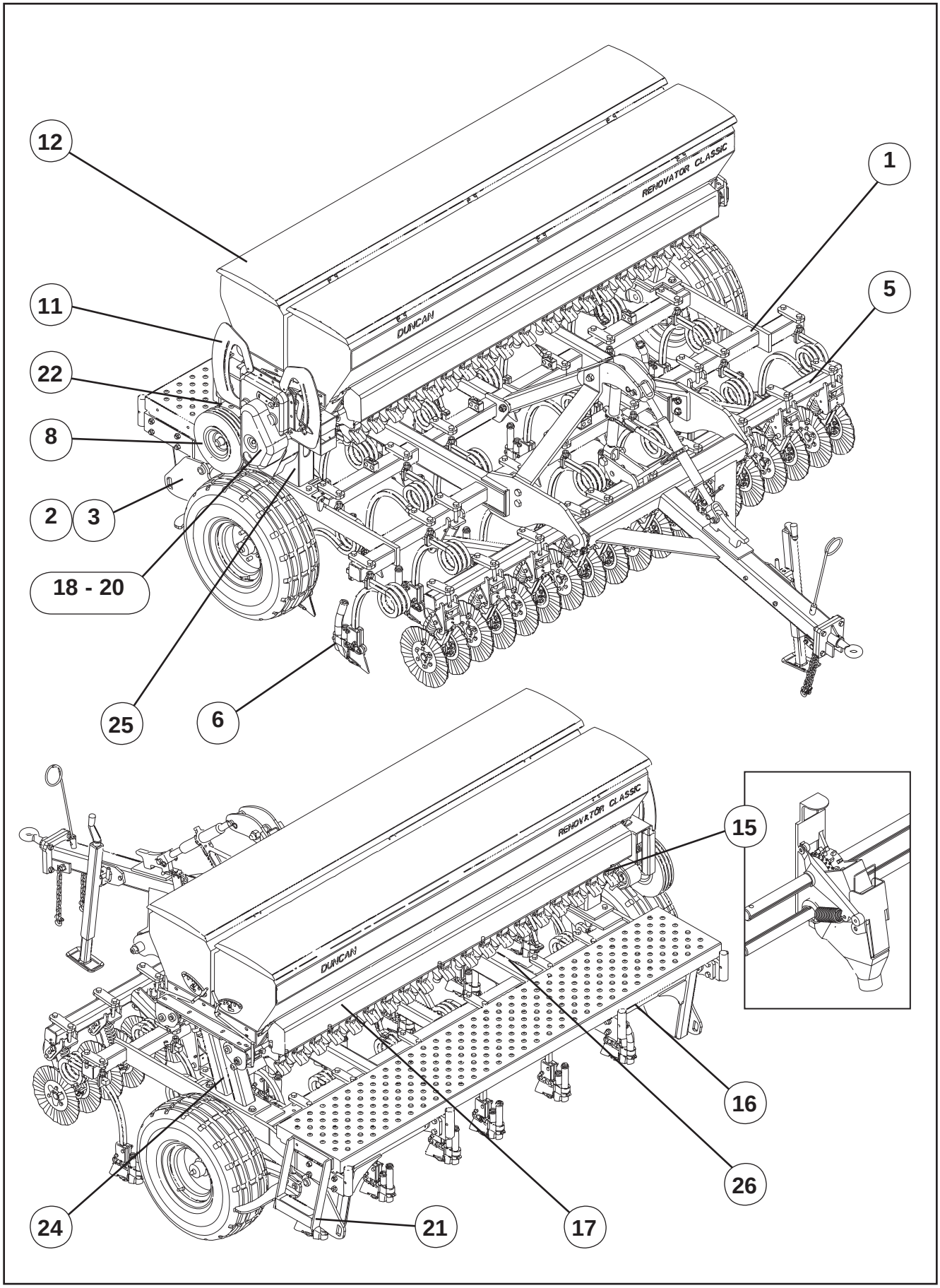
Pt. No. 67388
Issue 1210

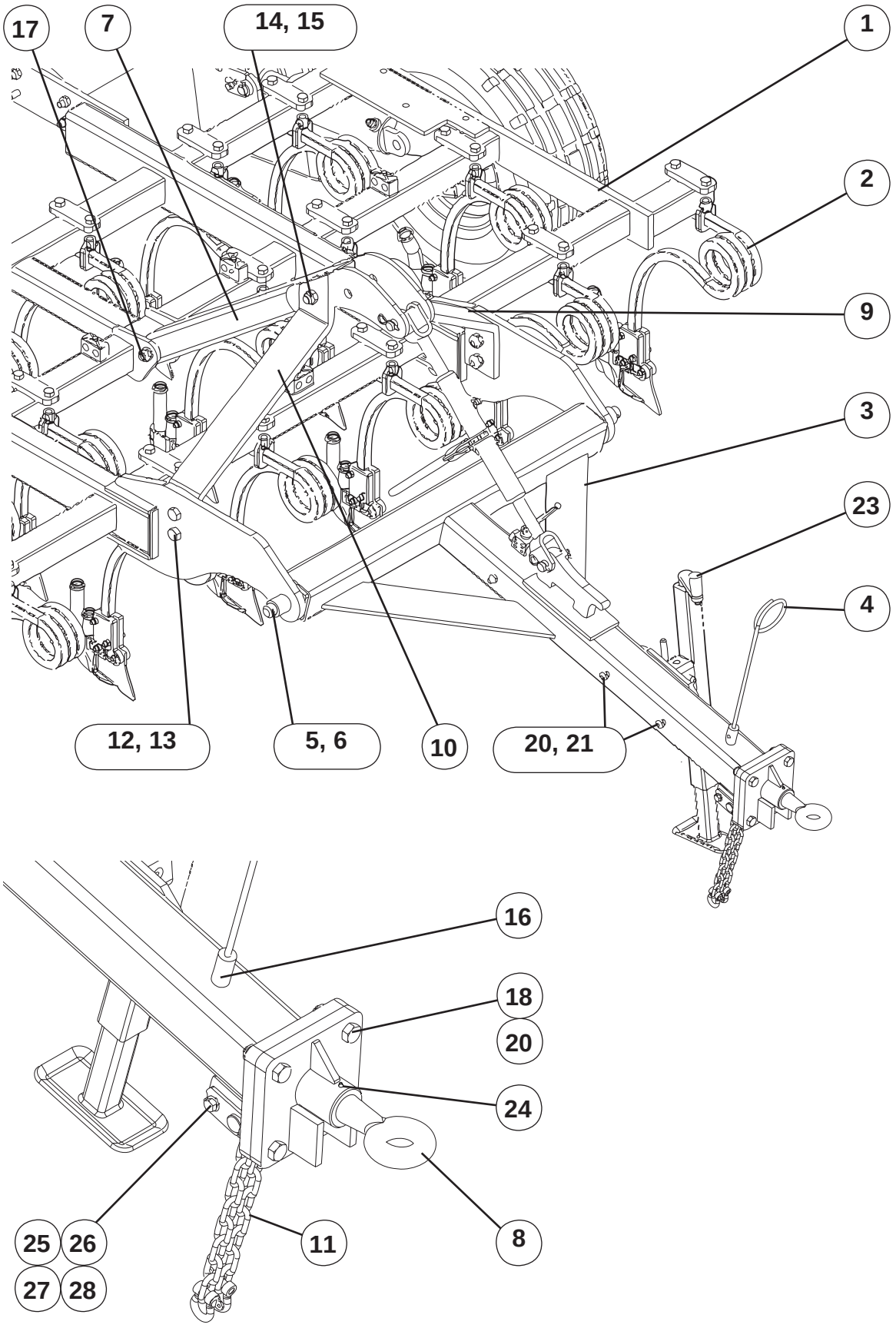
‘Renovator Classic’ Complete Assembly



‘Renovator Classic’ Complete Assembly

ITEM	PART No.	DESCRIPTION	QTY
1	Refer pages 40-43	Main Frame and Drawbar Assembly	1
2	Refer page 44	Wheel Leg	1
3	Refer page 46	Wheel Hydraulics	1
4	Refer page 68	Wiring and Lighting (Optional - not shown)	1
5	Refer page 64	Disc Opener Assembly (Optional)	1
6	Refer page 48	Tine and Boot Assembly	19
7	Refer page 50	Drive Chains (Not shown)	4
8	Refer page 56	Jockey Wheel and Transfer Drive System	1
9	Refer pages 63	Hectaremeter Kit (Optional - Not shown)	1
10	Refer page 54	Seed Box Drive Shafts	2
11	Refer page 55	Gearbox Final Assembly	1
12	Refer page 58	Seedbox Assembly	2
13	Refer page 60	Agitator Drives	2
14	Refer page 61	Agitator Shaft Assembly (Inside Seedbox)	2
15	Refer page 62	Seeder Mechanism	-
16	26623	Footboard Assembly	1
17	22562	Calibration Tray	4
18	25995	Drive Guard	1
19	25730	Jockey Arm Tension Spring	1
20	25723	Jockey Arm Tension Eyebolt	1
21	26575	Footboard Step	1
22	22051	Crank Arm and Handle Assy	1
23	22916	3.0m Weather Skirt (Optional)	2
24	22541	LH Pedestal W/Assy (Dual)	1
25	26562	Drive Pedestal W/Assy	1
26	26599	Calibration Tray Bracket	8

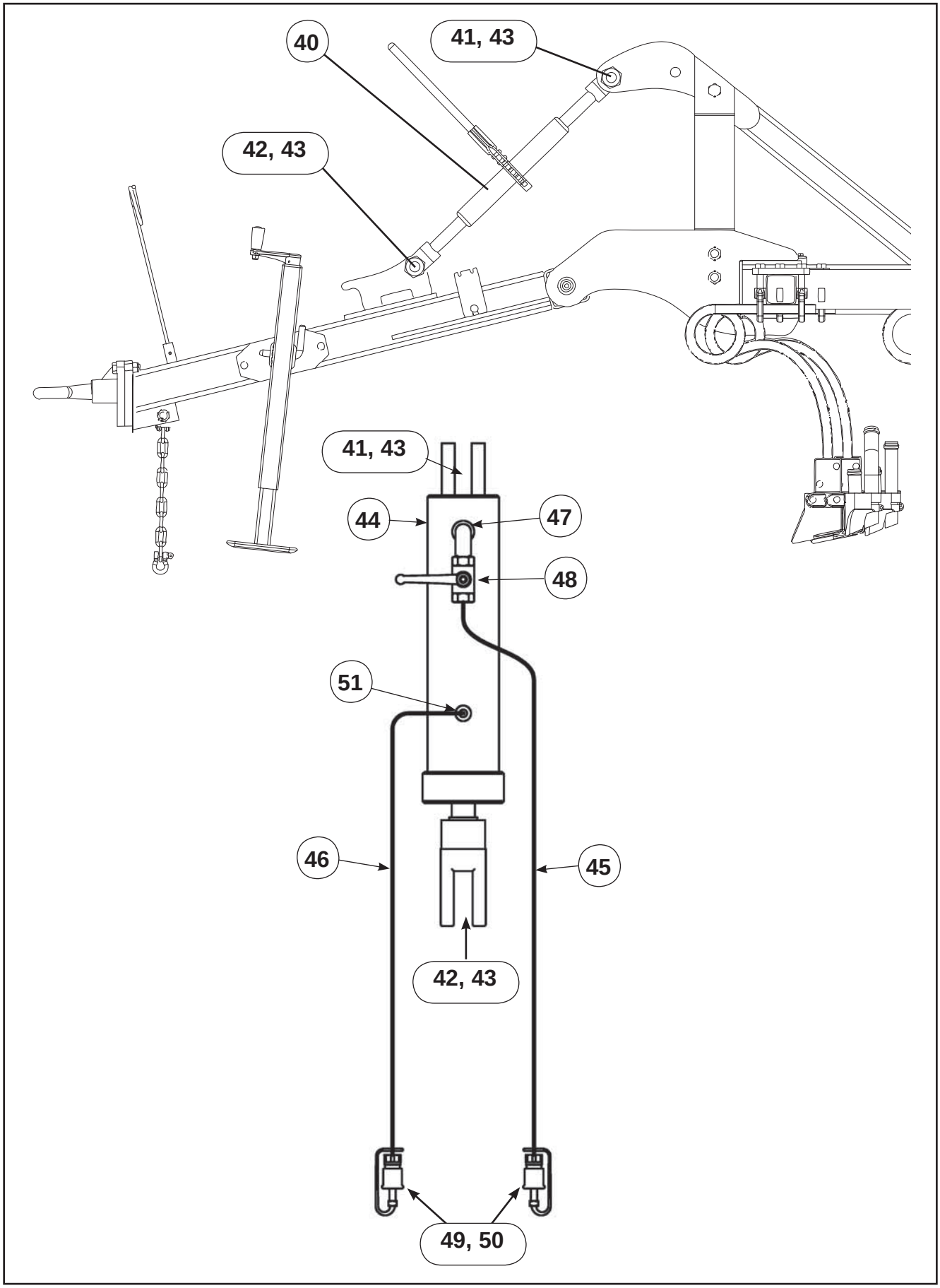
‘Renovator Classic’ Mainframe and Drawbar



‘Renovator Classic’ Mainframe and Drawbar

ITEM	PART No.	DESCRIPTION	QTY
1	26512	19R Mainframe	1
2	Refer page 48	Coil Tines & Boots	-
3	26550	Drawbar Assembly	1
4	4800315	Hose Support	1
5	60094	Drawbar Axle	1
6	45285	Roll Pin Ø10	2
7	26570	Centre Hitch Welded Assembly	1
8	26580	Towing Eye Assembly	1
9	26577	LH Support Stay	1
10	26578	RH Support Stay	1
11	43830	Safety Chain Assembly	2
12	45066	M20 x 70 Grade 8.8 Bolt	4
13	45141	M20 Nyloc Nut	6
14	47244	7/8" UNF Bolt x 6.5"	1
15	47548	7/8" UNF Nut	1
16	45181	M8 x 12 S/H Grub Screw	1
17	45075	M20 x 150 Grade 8.8 Bolt	1
18	45042	M16 x 60 Grade 8.8 Bolt	4
19	45140	M16 Nyloc Nut	4
20	45033	M12 x 120 Grade 8.8 Bolt	2
21	45139	M12 Nyloc Nut	3
23	Refer page 70	Jack Stand Kit – Optional	1
24	43007	Grease Nipple	1
25	22262	Clevis Pin Tabbed	1
26	45001s	M10 x 20 S/Screw Grade 8.8 Z/P	1
27	45152	M10 Light Flat Washer	1
28	45166	M10 Spring Washer	1

‘Renovator Classic’ Mainframe and Drawbar

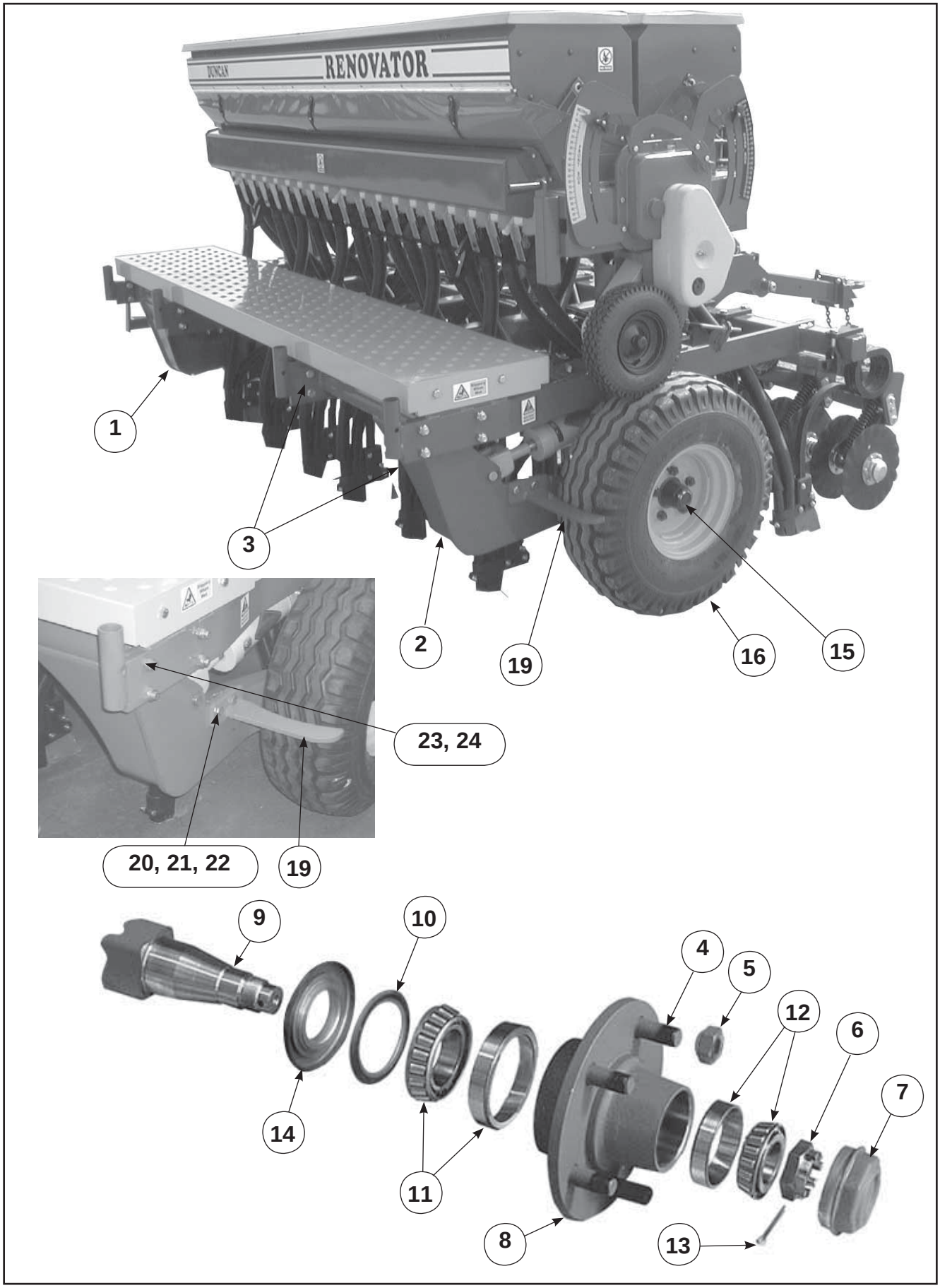


‘Renovator Classic’ Mainframe and Drawbar

ITEM	PART No.	DESCRIPTION	QTY
40	43395	H/D Ratchet Turnbuckle	1
41	47254	Bolt 1" UNF x 5" HT	1
42	47251	Bolt 1" UNF x 3.5" HT	1
43	47552	1" UNF Nyloc Nut	2
44	43852	Hydraulic Cylinder	1
45	26723	Hydraulic Hose 2.80m	1
46	26724	Hydraulic Hose 2.50m	1
47	43496	3/4” UNO to 3/8”BSPT Elbow	1
48	43393	3/8” BSP S/S Ball Valve	1
49	43147	1/2” BSP Quick Release Coupling	2
50	43617	Dust Cover	2
51	43280	3/4” UNO to 3/8” BSPM Nipple	1

Note:Drawbar hydraulic parts (41-51) can be purchased as a kit, part number 26720K.

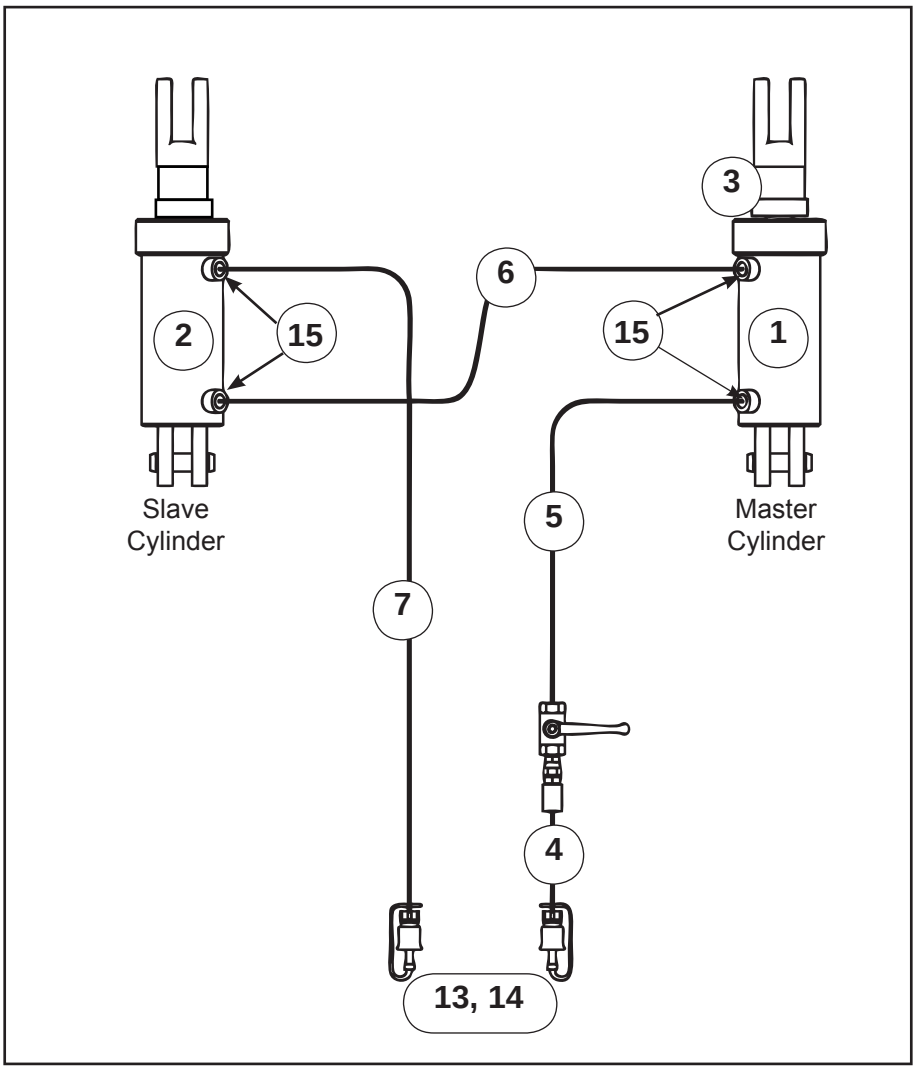
‘Renovator Classic’ Wheel Rocker System

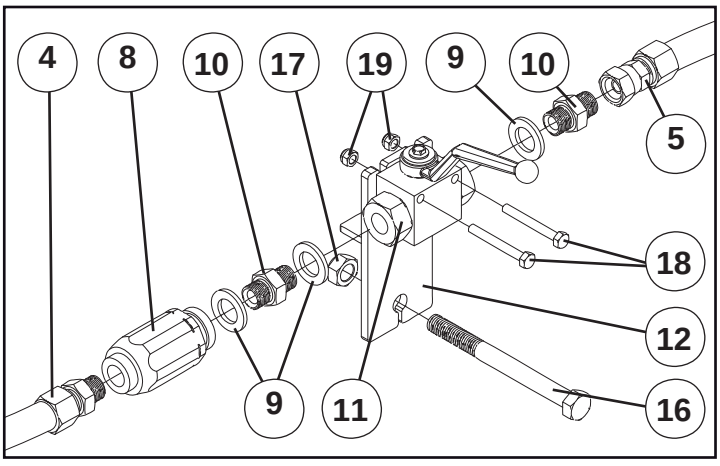


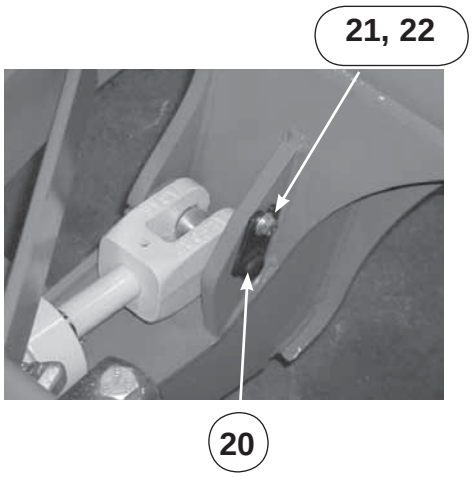
‘Renovator Classic’ Wheel Rocker System

ITEM	PART No.	DESCRIPTION	QTY
1	62013	LH Wheel Rocker Welded Assy	1
2	62014	RH Wheel Rocker Welded Assy	1
3	26585	Rocker Pivot Assy	4
4	43596	ADR M16-1.5P x45 Hub Stud	10
5	43597	ADR M16-1.5P Wheel Nut	10
6	43598	ADR M27-1.5P Castle Nut	2
7	43599	ADR 62mm Hub Cap	2
8	43600	ADR Hub MkII	2
9	26620	ADR MkII Stub Axle (Welded to Wheel Rockers)	2
10	43976	Seal Kit	2
11	43421	30209 J2 Inner Bearing	2
12	10282	30206 J2 Outer Bearing	2
13	45303	3.5 Diameter x 40 Long Cotter Pin	2
14		Trash Shield (part of item 10)	2
15	43836	Mk 2 ADR Hub and Stub Assembly Complete (Items 4-14)	2
16	43833	Wheel 10/80-12	2
17	26592	Rocker Shaft Plug (Not Shown)	4
18	62028	LH Wheel Scraper Assy	1
19	62029	RH Wheel Scraper Assy	1
20	45437	M12x 50 Bolt	4
21	45139	M12 Nyloc Nut	4
22	45153	M12 Light Flat Washer	4
23	45042	M16 x 60Grade 8.8 Bolt	16
24	45140	M16 Nyloc Nut	16
25	43120	M8 x 1.25 Pitch Grease Nipple x 90 degree (Not Shown)	4

‘Renovator Classic’ Wheel Rocker Hydraulics



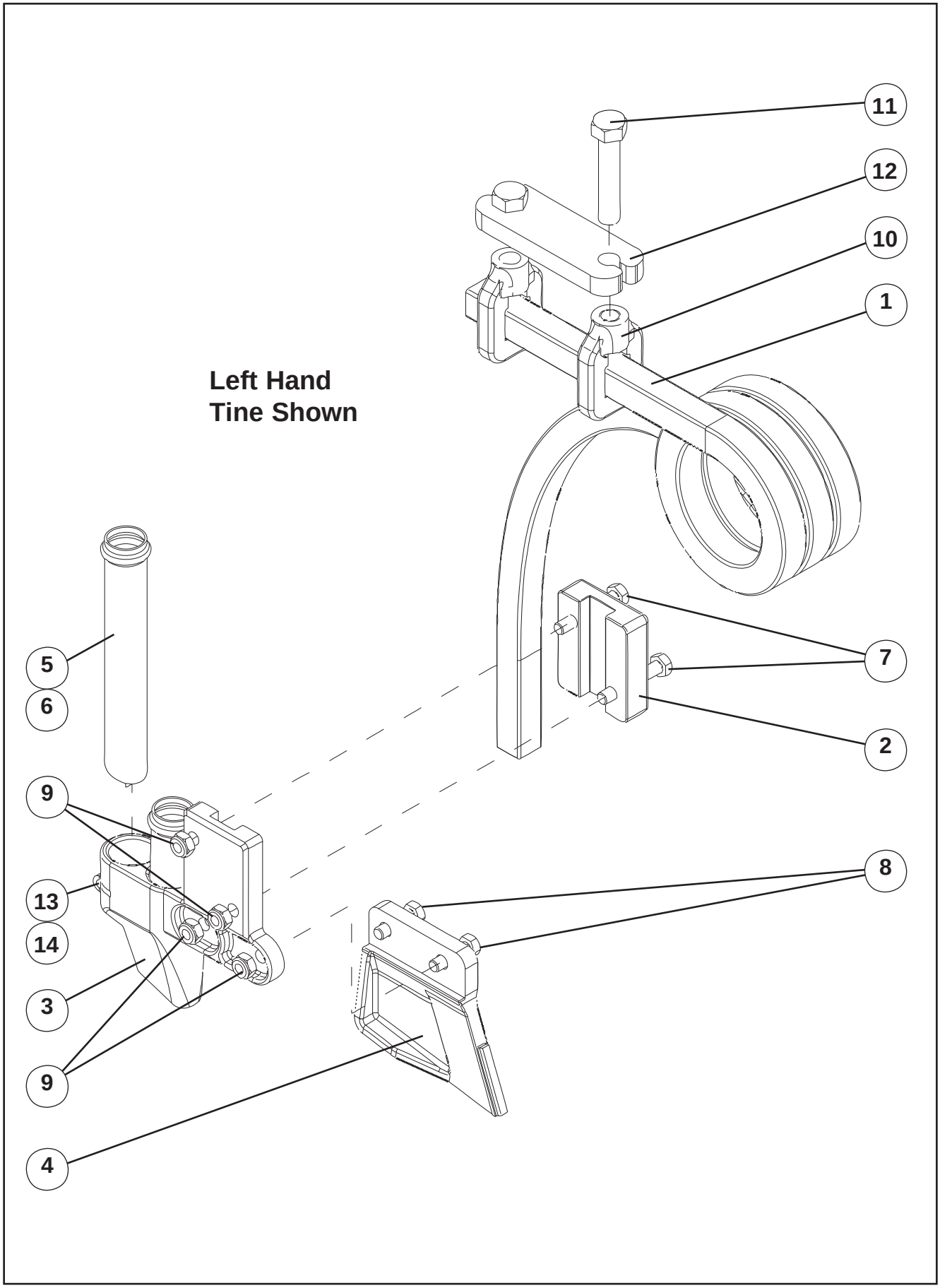




‘Renovator Classic’ Wheel Rocker Hydraulics

ITEM	PART No.	DESCRIPTION	QTY
1	26702	3.5” x 6.5” Master Rephasing Cylinder (Includes pin)	1
2	26703	3.25” x 6.5” Slave Rephasing Cylinder (Includes pin)	1
3	43848	Stroke Limiting Collar 7/8” (where fitted)	1
4	60866	Hydraulic Hose, 2.70m	1
5	26713	Hydraulic Hose, 2.33m	1
6	26714	Hydraulic Hose, 2.80m	1
7	26715	Hydraulic Hose, 5.30m	1
8	43028	3/8" Flow Control	1
9	43391	3/8" Dowty Washer	3
10	43392	3/8" BSPP Male Nipple	2
11	43393	3/8” BSP S/S Ball Valve	1
12	60856	Hydraulic Valve Support Assy	1
13	43147	1/2” BSP Quick Release Coupling	2
14	43617	Dust Cover	2
15	43280	3/4” UNO to 3/8” BSP Nipple	4
16	45033	M12 x 120 Bolt	1
17	45139	M12 Nyloc Nut	1
18	44957	M6 X 50 Bolt	2
19	45136	M6 Nyloc Nut	2
20	22262	Clevis Pin Assembly	2
21	45418s	M10 x 25 Set Screw	2
22	45166	M10 Spring Washer	2

‘Renovator Classic’ Tine and Boot Assembly

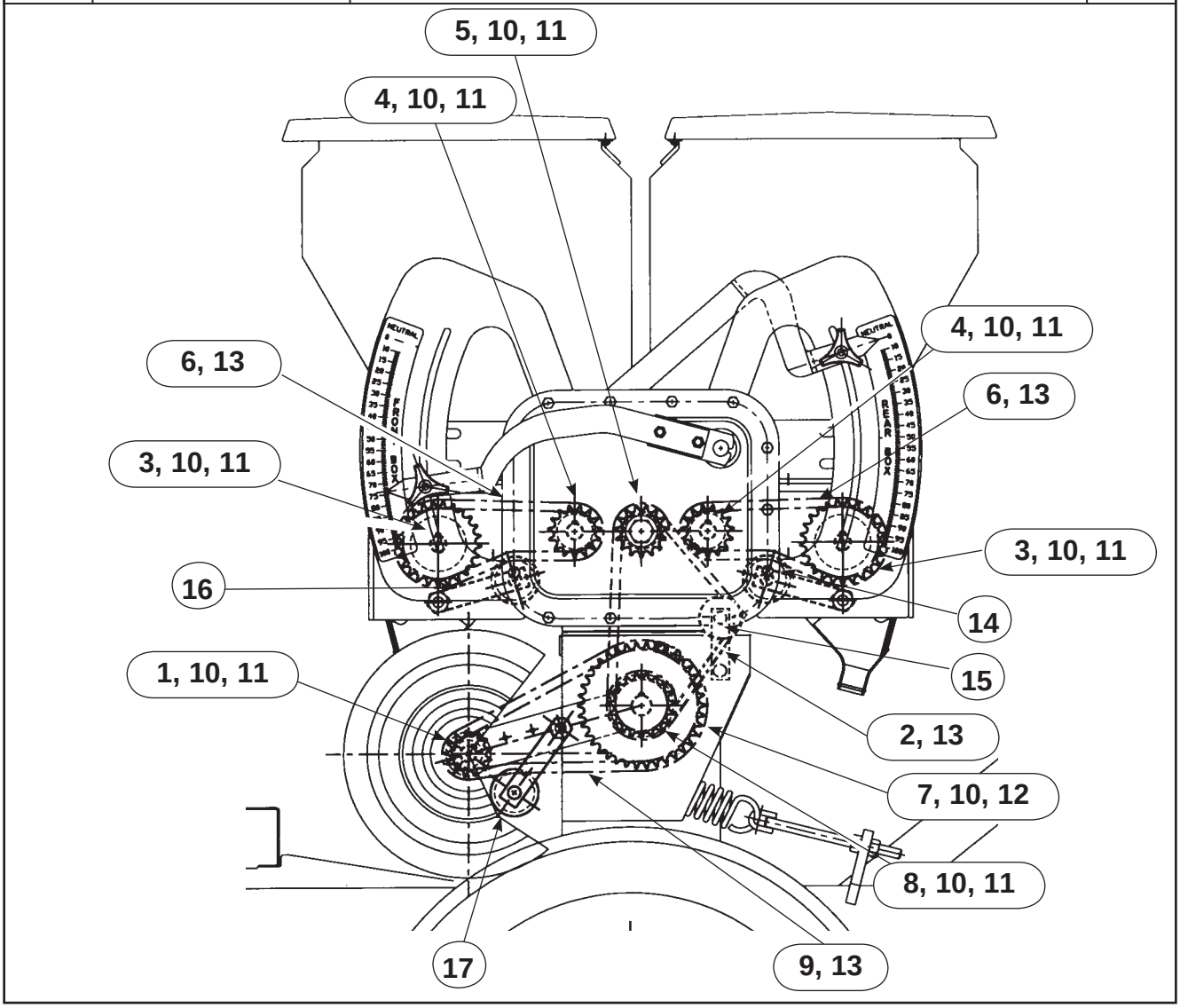


‘Renovator Classic’ Tine and Boot Assembly

ITEM	PART No.	DESCRIPTION	QTY
1	21413	LH Coil Tine	10
1	21414	RH Coil Tine	19
2	26848	LH Inverted Tee Clamp	19
3	25615	RH Inverted Tee Clamp	19
4	26849	Cast Inverted Tee Point	19
5	25608	Fertilizer Tube, Standard (dual box)	13
6	25613	Fertilizer Tube, Angle (dual box)	6
7	45010	M10 x 65 Bolt, Class 8.8	38
8	45003	M10 x 30 Bolt, Class 8.8	38
9	45138	M10 Nyloc Nut	76
10	21691	Tine Clamp Casting	38
11	45466	M16 x 80 (4.6) Zinc Plated Bolt	38
12	21690	75 x 75 RHS Clamp Plate	19
13	45413	M8 x 35 Bolt (dual box)	19
14	45137	M8 Nyloc Nut (dual box)	19
15	43691	Feed Hose 38mm	per mtr
16	43500	Cray Clip 47-49mm (fitted to top of hose not shown)	19

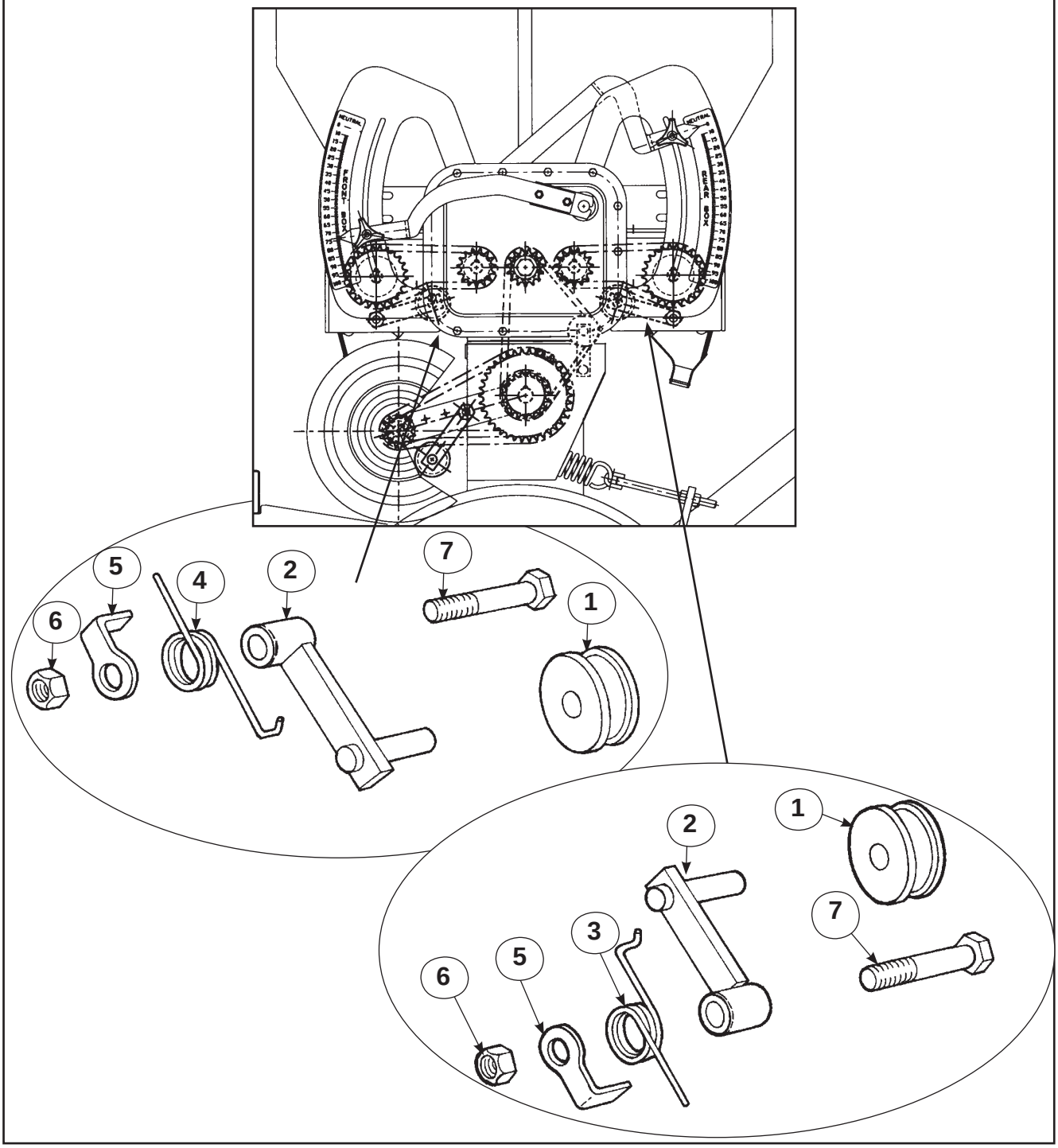
‘Renovator Classic’ Drive Chains Dual Box

ITEM	PART No.	DESCRIPTION	QTY
1	25724	13 T Sprocket 1/2” P x 20mm Bore	1
2	22466	1/2” BS Chain x 55 Links (Transfer Shaft to Gearbox input)	1
3	22537	25 T Sprocket 1/2” P x 20mm Bore	2
4	22044	15 T Sprocket 1/2” P x 20mm Bore	2
5	26350	13T/21T Change Sprocket	1
6	25780	1/2” BS Chain x 47 Links (Gearbox to Boxshaft)	2
7	25742	38 T Sprocket 1/2” P x 25mm Bore	1
8	26352	13T/21T Crank Sprocket	1
9	24103	1/2” BS Chain x 61 Links (Jockey Wheel Drive)	1
10	22294	Sprocket Key (6 x 6 x 25)	8
11	45180	M8 x 10 Socket Head Grub Screw	14
12	45181	M8 x 12 Socket Head Grub Screw	2
13	43388	1/2” Pitch Joining Link	4
14	Refer page 54	Front Chain Tensioner Box Shaft	1
15	Refer page 52	Chain Tensioner Transfer Drive	1
16	Refer page 54	Rear Chain Tensioner Box Shaft	1
17	Refer page 53	Chain Tensioner Jockey Wheel Drive	1



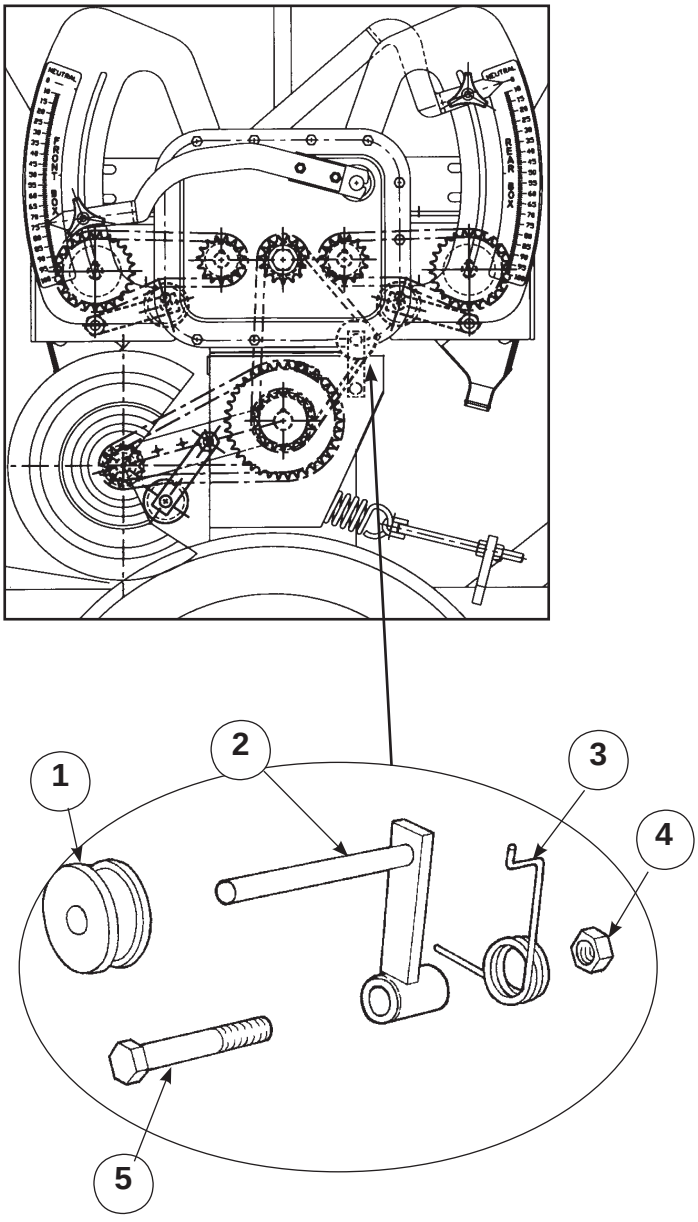
‘Renovator Classic’ Box Shaft Chain Tensioners

ITEM	PART No.	DESCRIPTION	QTY
1	22535	Nylon Roller	2
2	22480	Arm Assembly, RH	2
3	22522	Torsion Spring, LH	1
4	22523	Torsion Spring, RH	1
5	23376	Chain Tensioner Anchor	2
6	45132	M16 Hex Nut	2
7	45462	M16 x 60 Bolt	2



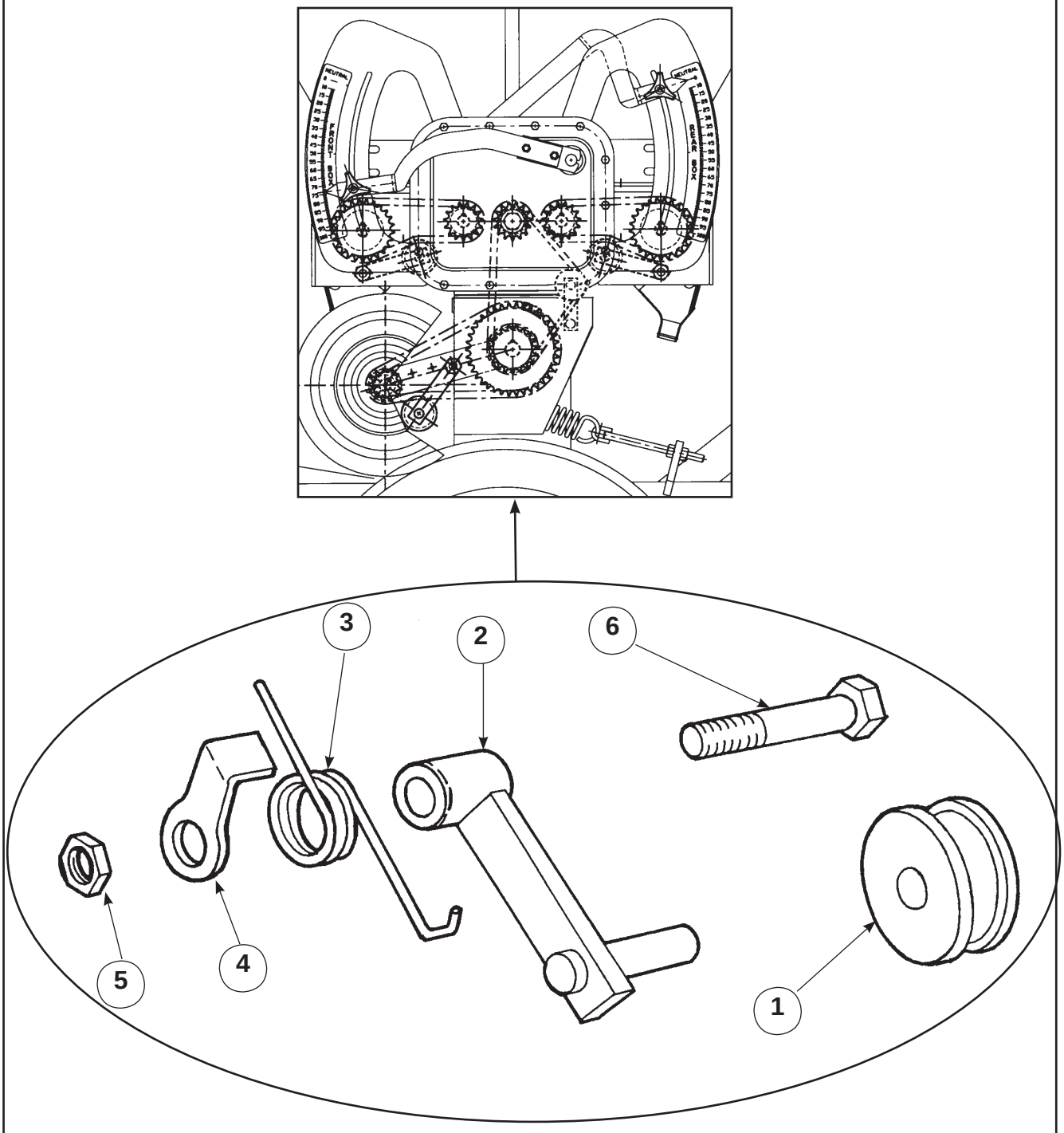
‘Renovator Classic’ Transfer Drive Chain Tensioners

ITEM	PART No.	DESCRIPTION	QTY
1	22535	Nylon Roller	1
2	25984	Arm Assembly, RH, 60 Extension	1
3	22523	Torsion Spring, RH	1
4	45132	M16 Hex Nut	1
5	45461	M16 x 55 Bolt (Dual Box)	1



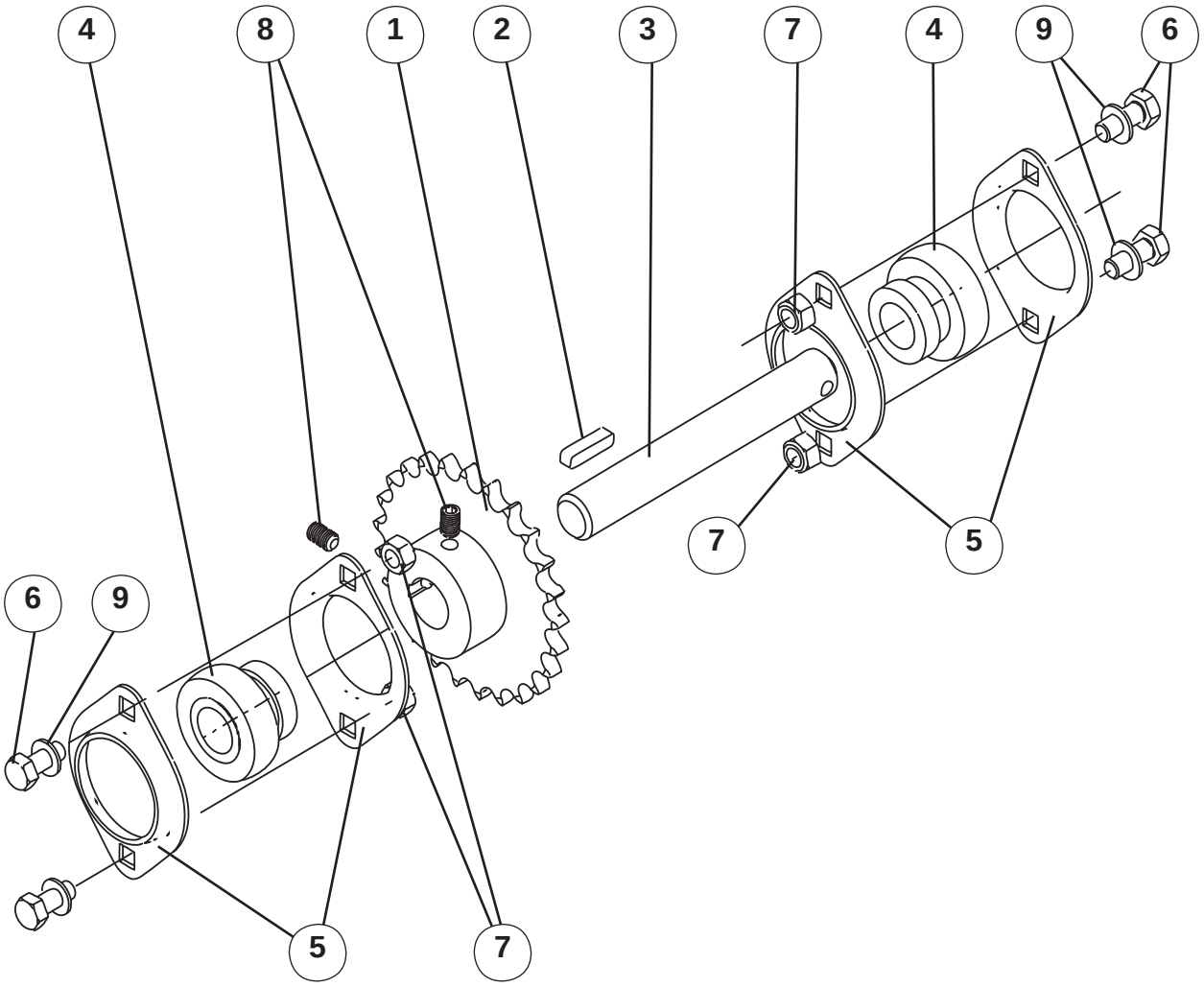
‘Renovator Classic’ Jockey Drive Chain Tensioners

ITEM	PART No.	DESCRIPTION	QTY
1	22535	Nylon Roller	1
2	23373	Short Arm Assembly, LH	1
3	22523	Torsion Spring, RH	1
4	23376	Chain Tensioner Anchor	1
5	45119	M16 Half Nut	1
6	45462	M16 x 60 Bolt	1



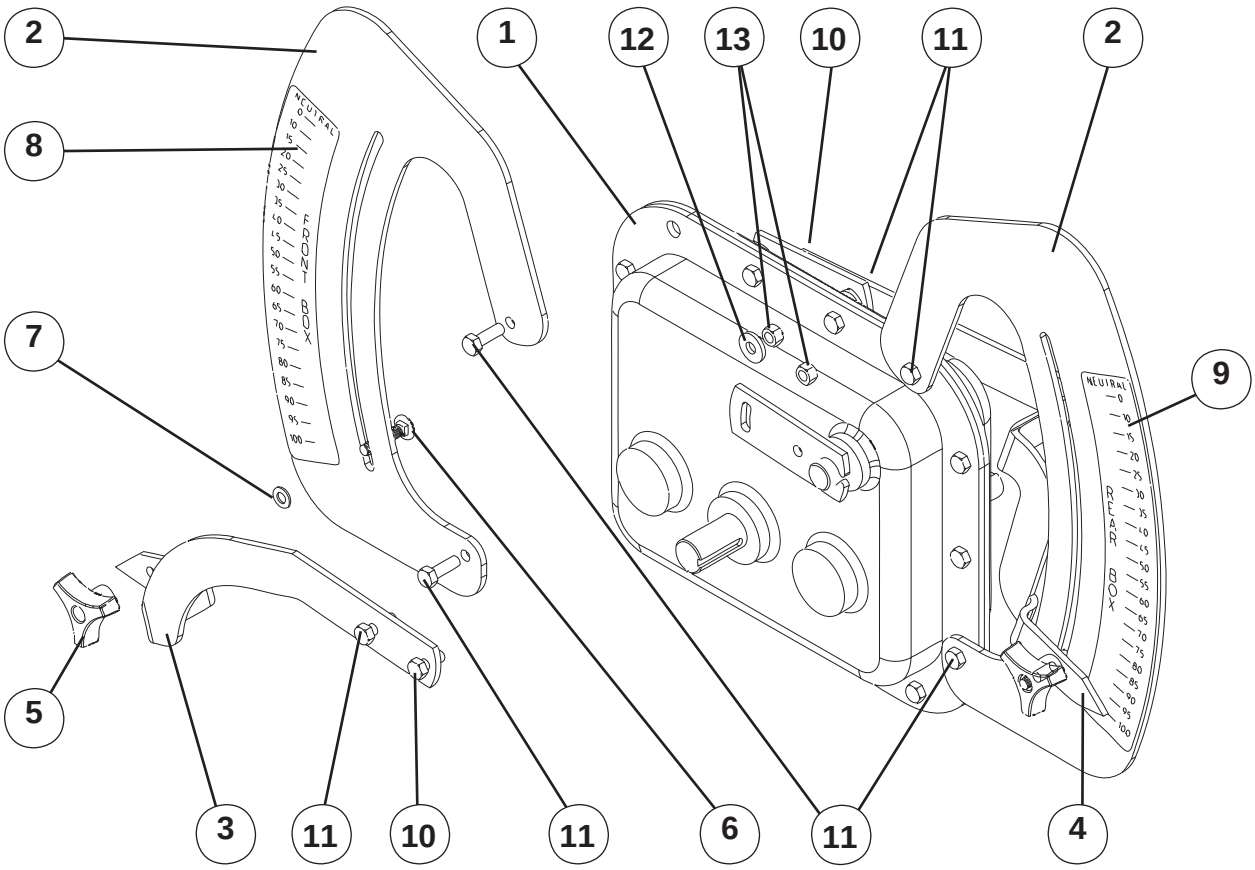
‘Renovator Classic’ Seed Box Drive Shafts

ITEM	PART No.	DESCRIPTION	QTY
1	22537	Sprocket, 25T x 1/2” Pitch	1
2	22294	Key, Sprocket 6 x 6 x 25	1
3	25758	Shaft, Box Drive	1
4	43385	“Y” Bearing	2
5	43387	Housing, Bearing, Press Steel (2 Flanges = 1 Housing)	2
6	45411S	Set Screw, M8 x 20, Zinc Plate	4
7	45137	Nut, M8, Nylock	4
8	45181	Grubscrew, M8 x 12, Socket Head	2
9	45151	M8 Light Flat Washer	8

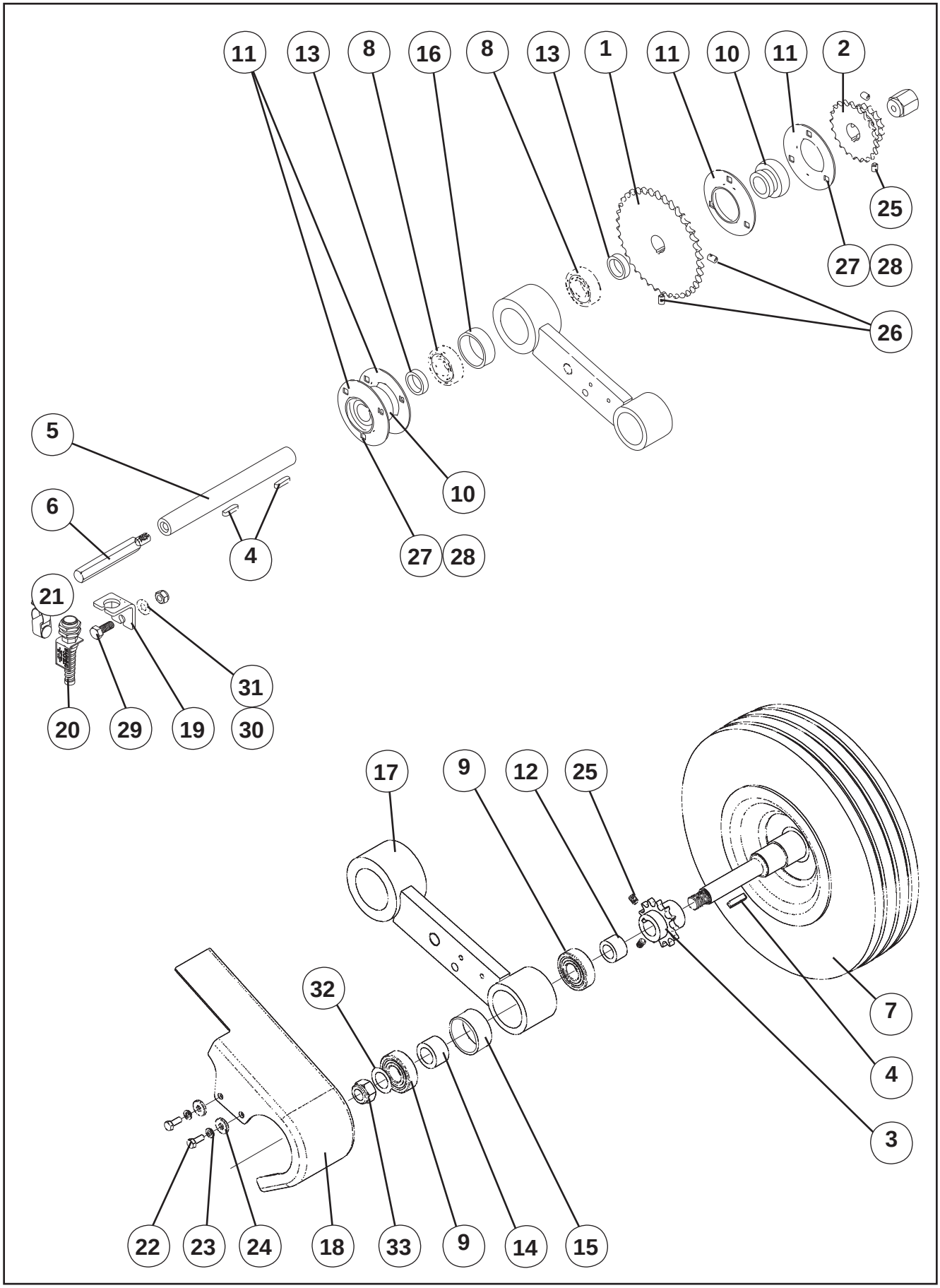


‘Renovator Classic’ Gearbox

ITEM	PART No.	DESCRIPTION	QTY
1	25756	Gearbox Sub-Assembly	1
2	22036	Quadrant, Speed Adjusting	2
3	25754	Lever, Front, Speed Adjusting	1
4	25755	Lever, Rear, Speed Adjusting	1
5	43366	Tri-Knob, M8, Tapped Centre	2
6	47031	Bolt, Coach, M8 x 40 Cup Head, Class 4.6, Zinc Plated	2
7	45151	Washer, Flat, M8, Light	2
8	22041	Label, Front Box Speed Indicator (black writing on yellow background)	1
9	22042	Label, Rear Box Speed Indicator (yellow writing on black background)	1
10	44992s	Set Screw M8 x 20 Grade 8.8 Zinc Plate	2
11	44993s	SetScrew M8 x 25 Grade 8.8 Zinc Plate	6
12	45157	Washer, Flat, M8, Heavy Duty, Zinc Plate	2
13	45137	Nut, M8 Nyloc	8
14	25762	Gearbox Final Assembly (Includes items 1 to 13)	1
15	26359	13T/21T 1/2”P Change Sprocket (not illustrated)	1
16	22294	Sprocket Key (not illustrated)	1
17	45180	Grub Screw, M8 x 10 Socket Head (not illustrated)	2



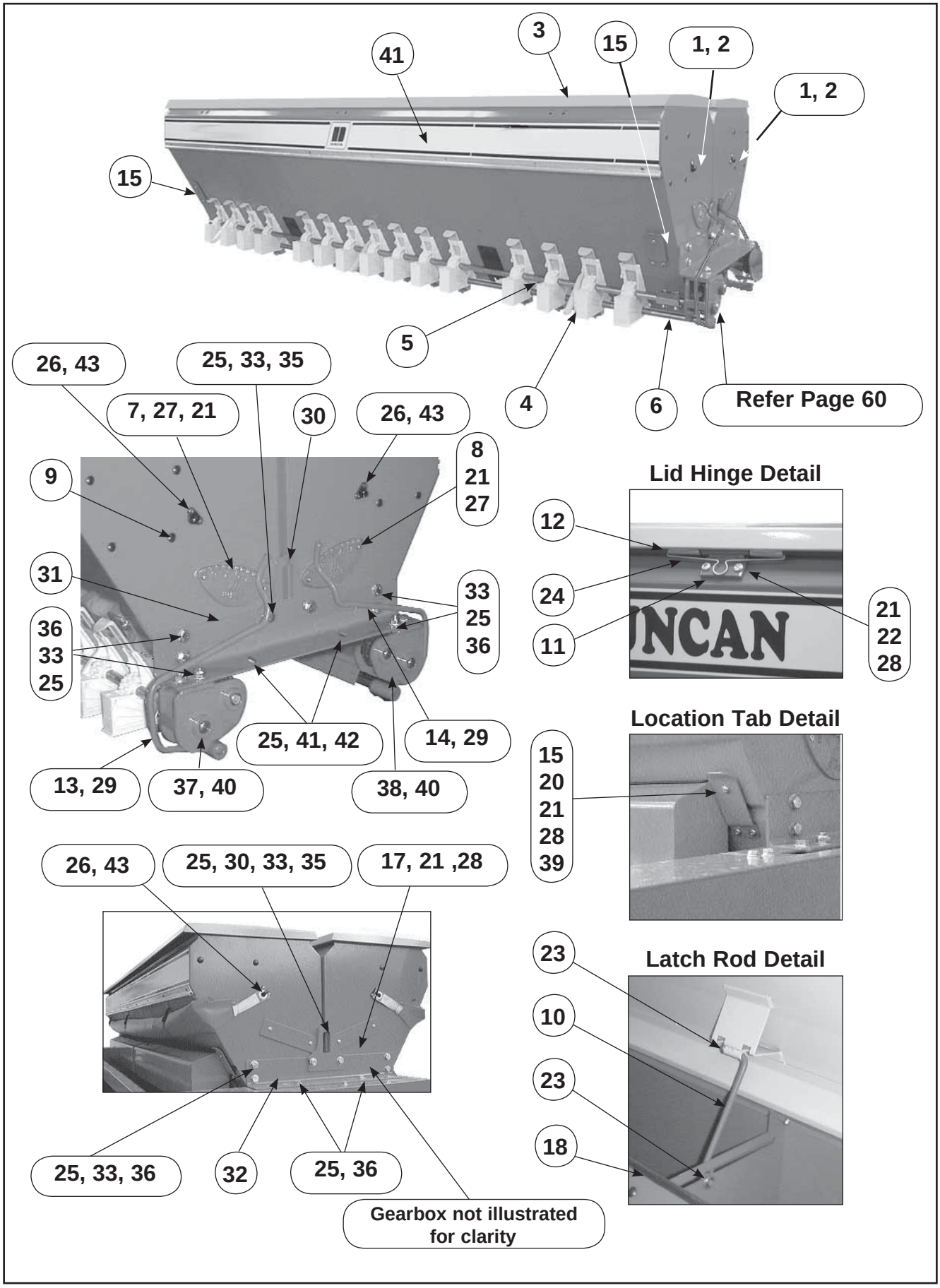
‘Renovator Classic’ Jockey Wheel Drive



‘Renovator Classic’ Jockey Wheel Drive

ITEM	PART No.	DESCRIPTION	QTY
1	25742	38T 1/2” P (25mm Bore) Sprocket	1
2	26352	13T/21T 1/2”P Crank Sprocket	1
3	25724	13T 1/2” P (20mm Bore) Sprocket	1
4	22294	6 x 6 x 25 Sprocket Key	3
5	26569	Drive Pedestal Shaft, Transfer	1
6	26568	Hexagonal Drive Shaft	1
7	25744	Jockey Wheel and Axle Assembly	1
8	43036	Drive Pedestal Transfer Shaft Bearing	2
9	17127	Jockey Wheel Axle Bearing	2
10	43386	“Y” Bearing	2
11	30359	3 Bolt Bearing Housing, PF52, (2 Flanges = 1 Housing)	2
12	25726	Jockey Drive Axle Spacer (where fitted)	1
13	25725	Jockey Arm Pivot Spacer	2
14	25739	Jockey Axle Inner Spacer	1
15	25727	Jockey Axle Outer Spacer (Loctite in place when fitted)	1
16	25729	Jockey Arm Pivot Outer Spacer (Loctite in place when fitted)	1
17	25735	Jockey Wheel Arm	1
18	25746	Jockey Drive Swing Guard	1
19	26567	Sensor Mount Bracket	1
20	43403	Sensor	1
21	43404	Magnet and Clamp	1
22	45401S	M6 x 16, Z/P Set Screw	2
23	45164	M6, Z/P Spring Washer	2
24	45156	M6, H/D Z/P Flat Washer	2
25	45180	M8 x 10 Socket Head Grubscrew	4
26	45181	M8 x 12 Socket Head Grubscrew	2
27	45411S	Set Screw, M8 x 20 Class 4.6, Zinc Plated	6
28	45137	M8, Nyloc Nut	6
29	45417S	M10 x 20 Class 4.6, Z/P Set Screw	1
30	45152	M10 Light Flat Washer	1
31	45138	M10 Nyloc Nut	1
32	47625	M16 Bellevilles Disc Washer	1
33	45140	M16 Nyloc Nut	1

‘Renovator Classic’ Dual Seedbox Assembly

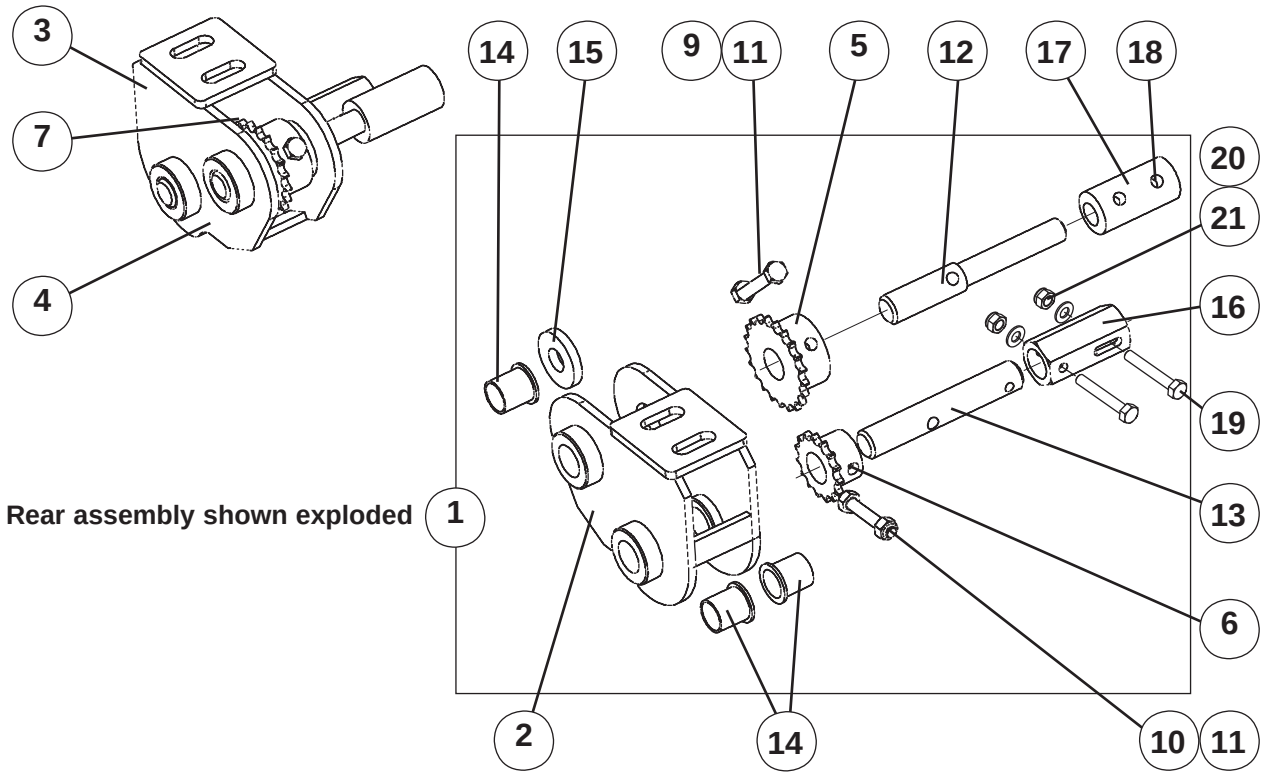


‘Renovator Classic’ Dual Seedbox Assembly

ITEM	PART No.	DESCRIPTION	QTY
1	26642	Combi Box Only (No Lid)	1
2	26646	Combi Box with Lid	2
3	257875	Box Lid Only	2
4	Refer page 62	Seeder Assembly	38
5	25812	Box Shaft (20mm)	2
6	22530	Flap Shaft (18mm)	2
7	10143	Front Box Quadrant Plate	1
8	10158	Rear Box Reverse Quadrant Plate	1
9	14442	Rubber Body Plug	28
10	22487	Latch Rod Assembly	2
11	22490	Hinge Assembly	6
12	22491	Hinge Pin	6
13	25708	Front Flap Handle Assembly	1
14	25709	Rear Flap Handle Assembly	1
15	22568	Location Tab (Calibration Tray)	4
16	47615	M6 x 40 Bolt S/Steel	8
17	22855	Agitator Access Blanking Plate	2
18	43373	Black Edge Trim 2.5m	2
19	22419	Box Shaft Connecting Sleeve	4
20	45122	M6 Class 8.8 Zinc Plated Hex Nut	4
21	45136	M6 Nylock Nut	36
22	45150	M6 Zinc Plated Light Flat Washer	12
23	45368	M10 Starlock Fixing Washer	4
24	27599	Hinge Pin Spring Clip	6
25	45139	M12 Nylock Nut	24
26	45702	4.8 x 9.5 Monel Pop Rivet	8
27	45758	M6 x 16 Zinc Plated Countersunk Posidrive Screw	4
28	45908	M6 x 16 Zinc Plated Pan Head Machine Screw	20
29	45186	M10 x 12 Socket Head Grubscrew	4
30	22485P	Box Set Lifting Eye Profile	2
31	25759	Box Set Mounting Bracket LH	1
32	25760	Box Set Mounting Bracket RH	1
33	45153	M12 Zinc Plated Light Flat Washer	32
35	45435S	M12 x 40 Set Screw	4
36	45433S	M12 x 30 Set Screw	12
37	22445	Front Agitator Drive Assembly (Refer Page 62)	1
38	22446	Rear Agitator Drive Assembly (Refer Page 62)	1
39	45907	M6 x 12 Pan Head Pozi Drive Screw M/C	12
40	Refer page 61	Agitator parts	2
41	43737	Renovator Classic Transfer	2
41	45434	M12 x 35 Bolt	2
42	45159	M12 H/D Flat Washer	2
43	43430	Lashing Hook	4

‘Renovator Classic’ Agitator Drives

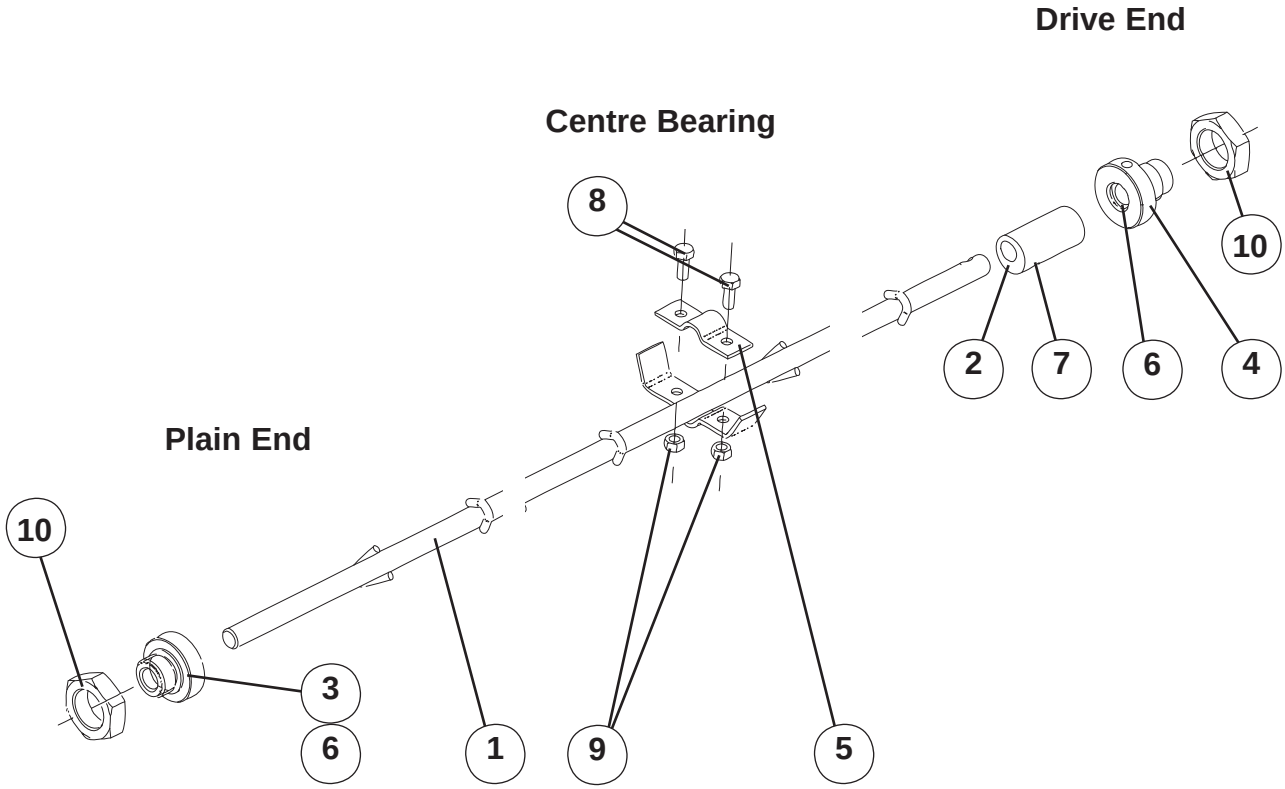
ITEM	PART No.	DESCRIPTION	QTY
1	22446	Agitator Drive Rear Housing complete with internals	1
2	22414	Rear Housing only	1
3	22445	Agitator Drive Front Housing complete with internals	1
4	22415	Front Housing only	1
5	22418	3/8” Pitch x 20mm Bore 21T Sprocket	2
6	22422	3/8” Pitch x 20mm Bore 15T Sprocket	2
7	22417	3/8” Pitch x 33 Link BS Chain	2
8	43396	3/8” Pitch Joiner Link	2
9	44968	M8 x 60 Class 8.8 Zinc Plated Bolt	2
10	44965	M8 x 45 Class 8.8 Zinc Plated Bolt	2
11	45137	M8 Nylock Nut	4
12	22425	Agitator Shaft Extension	2
13	22426	Seed Shaft Extension	2
14	43428	Nylon Bush	6
15	22416	Agitator Drive Spacer	2
16	22419	Box Shaft Connecting Sleeve	2
17	22420	Agitator Shaft Joining Collar	2
18	45180SS	M8 x 10 Stainless Steel Socket Head Grub Screw	4
19	44956SS	M6 x 40 Bolt S/Steel	4
20	45136SS	M6 Nyloc Nut S/Steel	4
21	45150SS	M6 Light Flat Washer	4



Rear assembly shown exploded

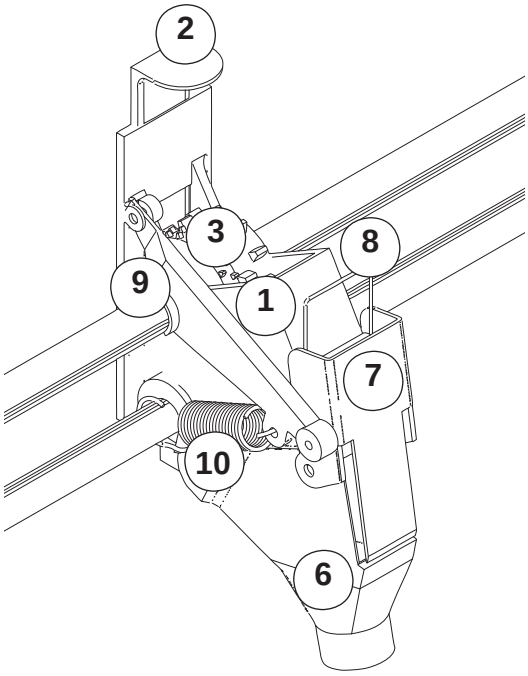
‘Renovator Classic’ Agitator Shaft Assembly

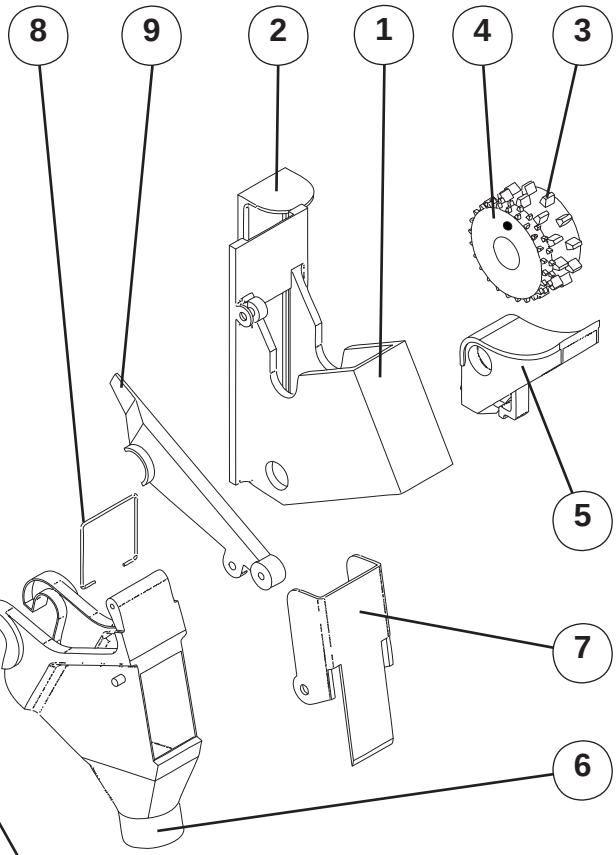
ITEM	PART No.	DESCRIPTION	QTY
1	62048	Agitator Shaft Assembly	1
2	22420	16mm Agitator Joining Collar	2
3	22423	Agitator Shaft Support RH (Short)	2
4	22424	Agitator Shaft Support LH (Long)	2
5	22428	Agitator Shaft Support Cap	2
6	43442	5/8” Lurethane Wiper Seal	4
7	45185SS	M10 x 10 Stainless Steel Sockept Head Grubscrew	4
8	45410SSS	M8 x 16 Grade 316 Stainless Steel Set Screw	4
9	45137SS	M8 Grade 316 Stainless Steel Nylock Nut	4
10	47600	M30 ISO Fine Zinc Plated Hex Lock Nut	4

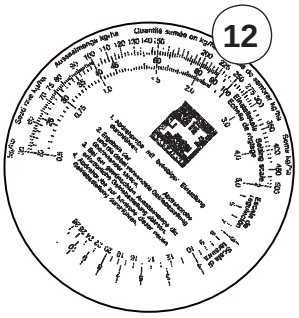


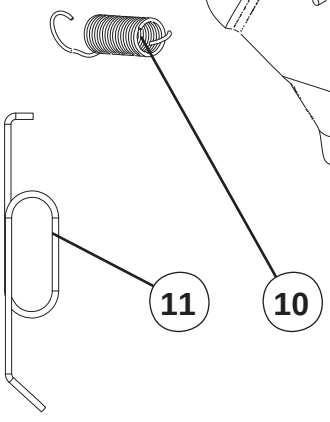
‘Renovator Classic’ Seeder Mechanism

ITEM	PART No.	DESCRIPTION	QTY
1	43375	Metering Housing	1 per run
2	43376	Shutter Slide	1 per run
3	43377	Seed Metering Wheel Assembly (Includes item 4)	1 per run
4	43374	Fine Seed Wheel (For Spares Ordering Only)	-
5	43378	Bottom Flap & Bolt Assembly	1 per run
6	22550	Seeder Extension Funnel	1 per run
7	22551	Seed Diverter	1 per run
8	22548	Spring Clip, S/S	1 per run
9	43379	Seed Shaft Guide Bearing	6
10	43380	Guide Bearing Tension Spring	6
11	43382	Metering Wheel Clutch Hook	1
12	43383	Seed Rate Disc Calculator	1
13	43362	Fine Seed Wheel Brush (Optional Extra)	-



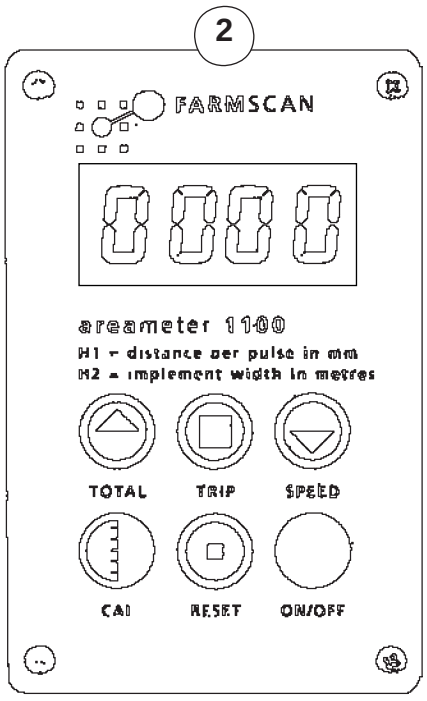




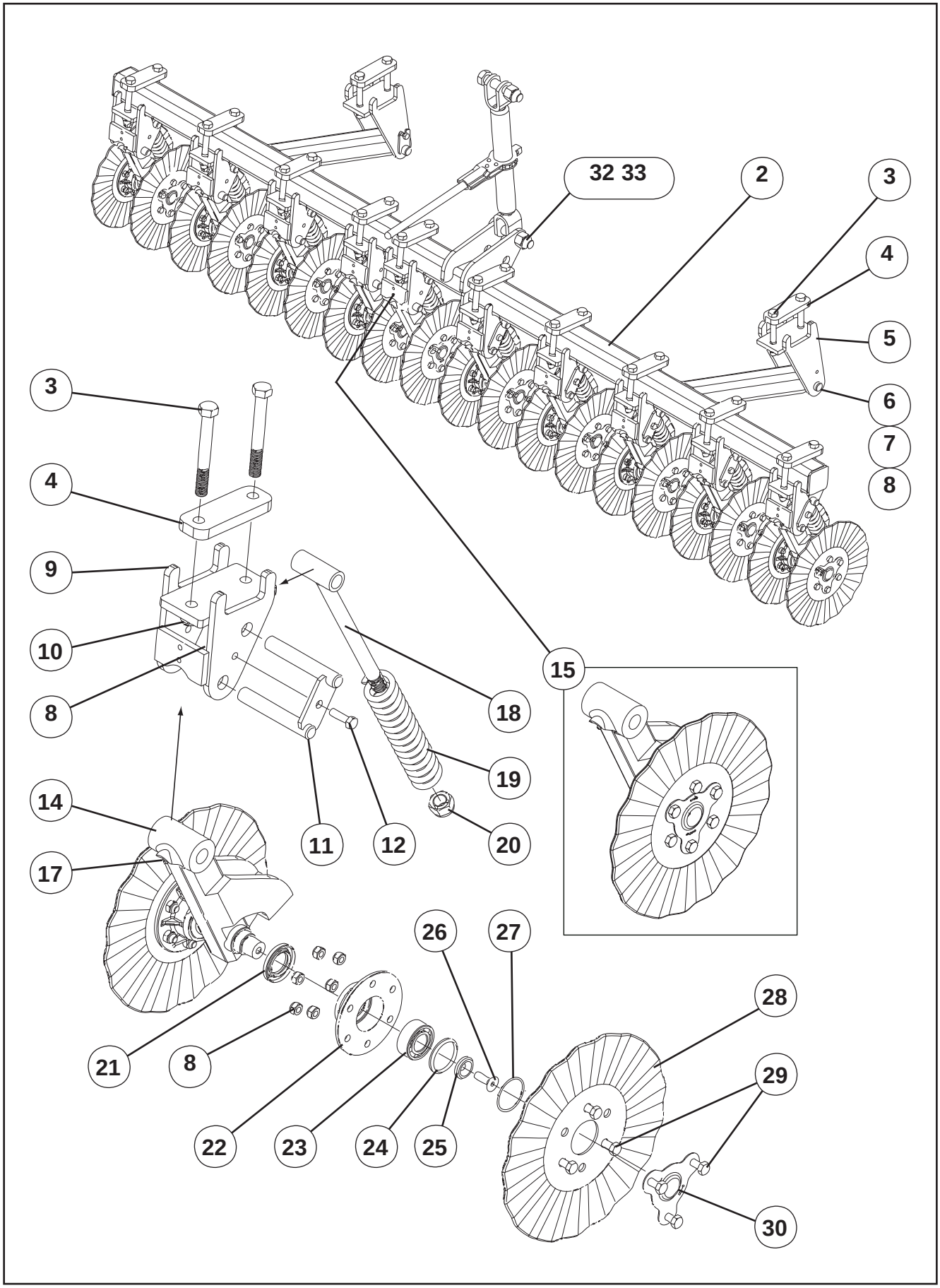


‘Renovator Classic’ (Optional) Hectaremeter Kit

ITEM	PART No.	DESCRIPTION	QTY
1	43409	Hectaremeter Kit, (Includes items 2 to 7)	1
2	43400	Hectaremeter	1
3	43408	Manual, Hectaremeter	1
4	43404	Magnet and Clamp	1
5	43403	Sensor	1
6	43453	Hectaremeter Cable	1
7	43461	Cable, Recharging	1
8	43455	Electronic Scales	1
9	43456	Calculator	1
10	43457	Sealtop Plastic Container	1



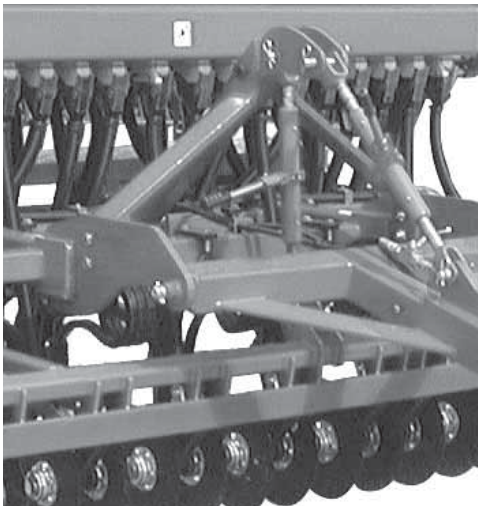
‘Renovator Classic’ (Optional) Disc Opener

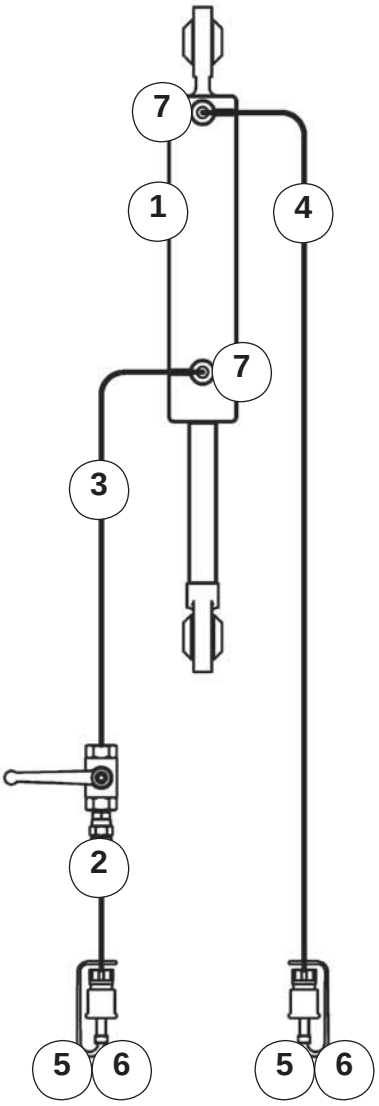


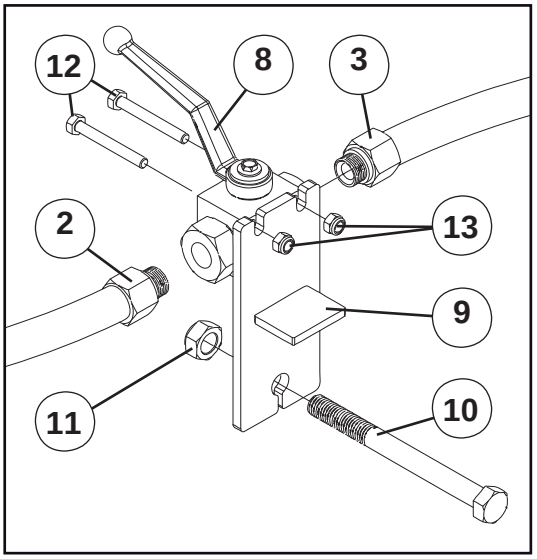
‘Renovator Classic’ (Optional) Disc Opener

ITEM	PART No.	DESCRIPTION	QTY
1	C/RCDO	Disc Opener Complete	1
2	62040	Disc Opener Frame	1
3	45051	M16 X 130 Class 8.8 Bolt	24
4	21690	Clamp Plate	12
5	25562	Disc Opener Frame Support Welded Assy	2
6	21245	Pivot Pin Assy	2
7	45001s	M10 x 20 Class 8.8 Set Screw	2
8	45138	M10 Nyloc Nut	108
9	60460	Mounting Bracket	10
10	45140	M16 Nyloc Nut	24
11	21244	Double Pivot Pin Assembly	10
12	45004	M10 x 35 Class 8.8 Bolt	10
13	60455	Double Disc Assembly	9
14	60459	Double Axle Arm Welded Assy	9
15	60452	Single Disc Assembly LH	1
16	60456	Single Axle Arm Welded Assy	1
17	43118	Grease Nipple Straight	10
18	26310	T Bolt Spring Rod	10
19	60294	Disc Opener Spring	10
20	45141	M20 Nyloc Nut	10
21	45650	Seal	19
22	60466	Housing	19
23	45652	Bearing	19
24	60469	Bearing Retainer (Outer Race)	19
25	60444	Bearing Retainer (Inner Race)	19
26	45662	M10 x 30 CSK Screw	19
27	45653	O Ring Seal	19
28	22035	Fluted Disc 318mm Dia.	19
29	45002s	M10 x 25 Class 8.8 Set Screw	114
30	60468	Cover Plate Stainless Steel	19
31	43395	H/D Ratchet Turnbuckle	1
32	47254	Bolt 1” UNF x 5” HT	2
33	47552	1” UNF Nyloc Nut	4

‘Renovator Classic’ (Optional) Disc Opener





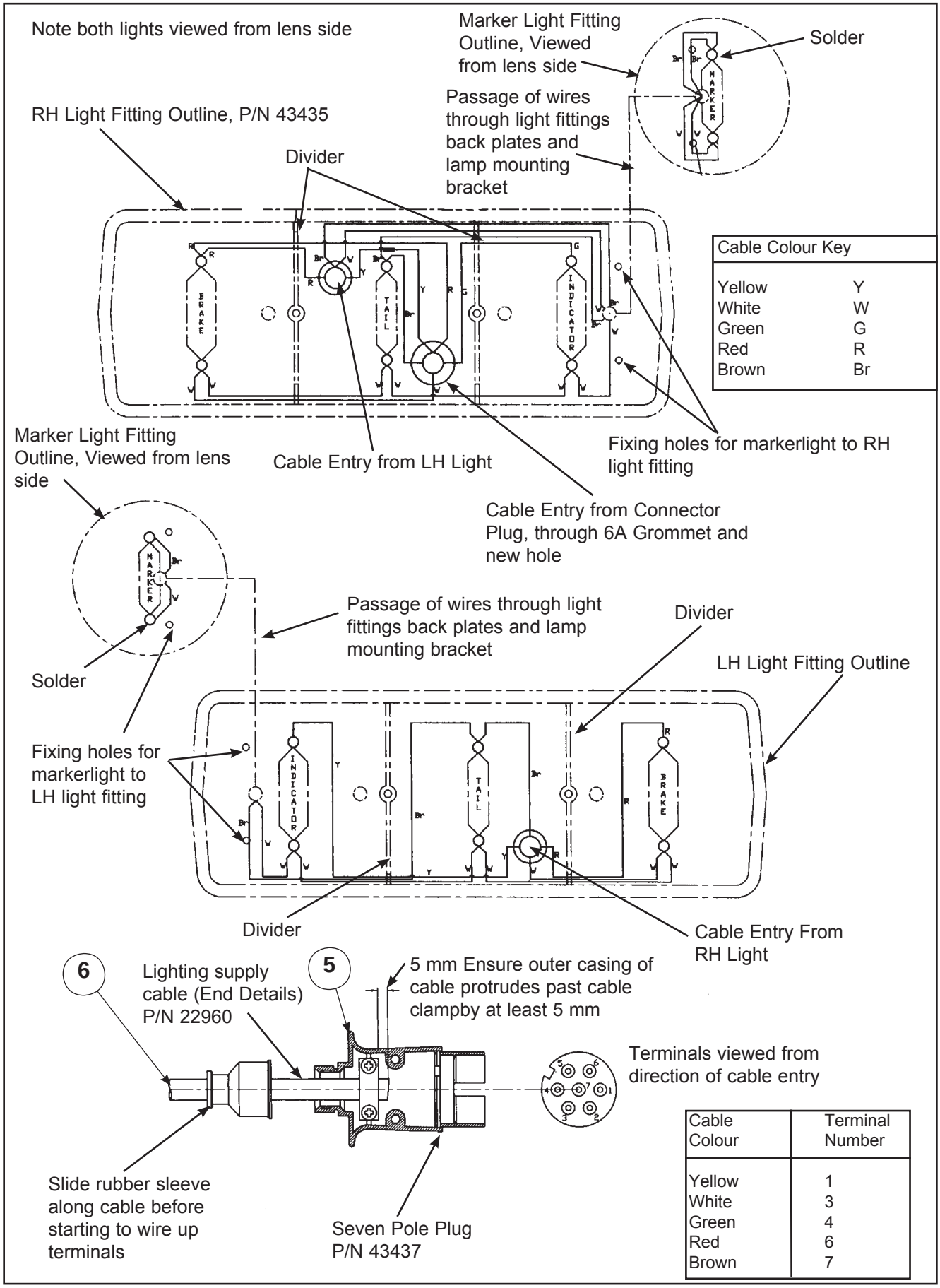


‘Renovator Classic’ (Optional) Disc Opener

ITEM	PART No.	DESCRIPTION	QTY
1	45655	Hydraulic Cylinder	1
2	60874	Hydraulic Hose 2.70m	1
3	26695	Hydraulic Hose 0.60m	1
4	26696	Hydraulic Hose 3.5m	1
5	43147	1/2” BSP Quick Release Coupling	2
6	43617	Dust Cover	2
7	43280	3/4” UNO to 3/8” BPSM Nipple	2
8	43393	3/8” BSP S/S Ball Valve	1
9	60856	Hydraulic Valve Support Assembly	1
10	45035	M12 x 140 Grade 8.8 Bolt	1
11	45139	M12 Nyloc Nut	1
12	44957	M6 x 50 Bolt	2
13	45136	M6 Nyloc Nut	2
14	47254	1.0 UNF X 5.0" HT Bolt	2
15	47552	1.0"UNF Nyloc Nut	2

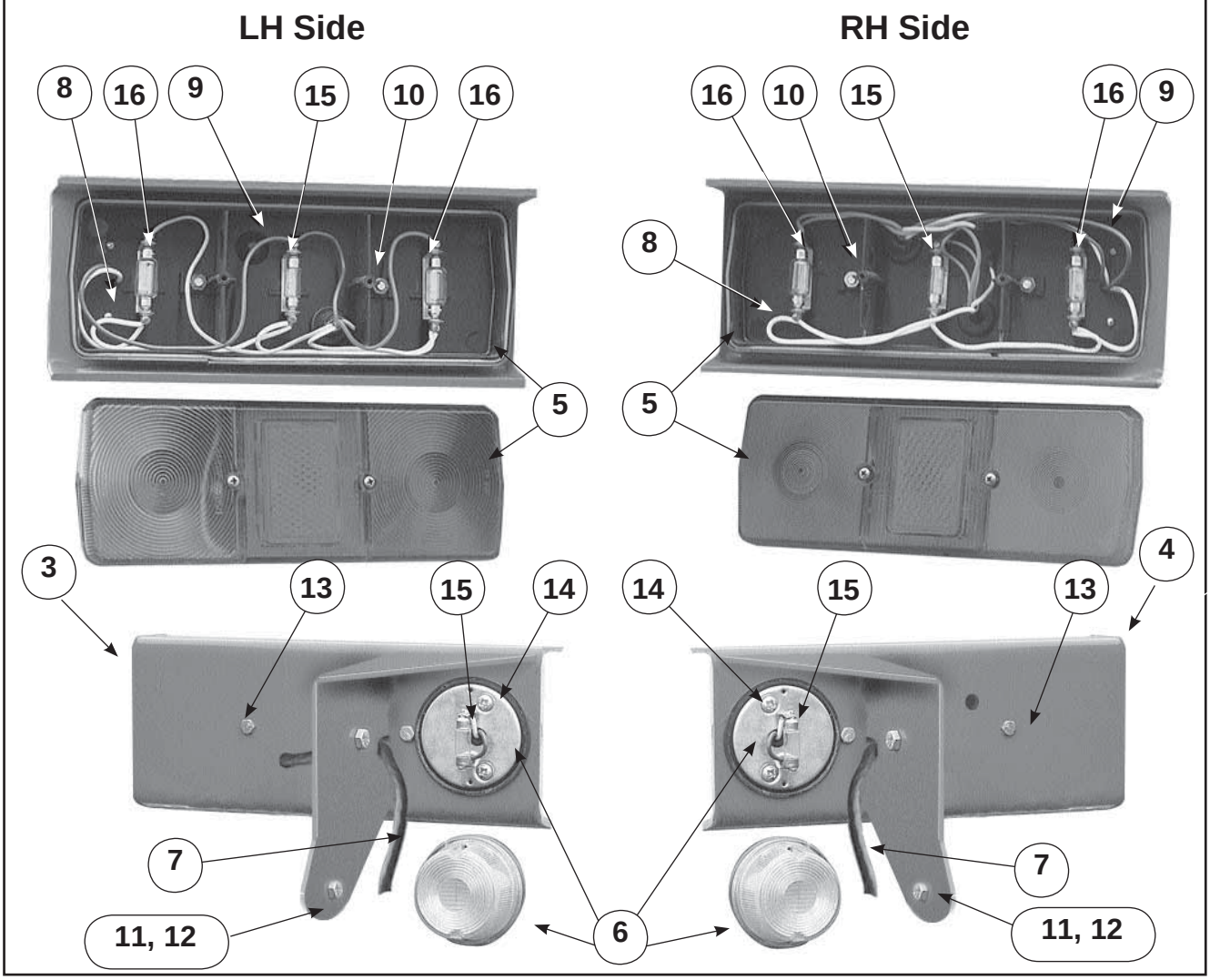
NOTE: Items 1 to 13 may be ordered as a kit. Part number 60076K

‘Renovator Classic’ (Optional) Wiring & Lighting

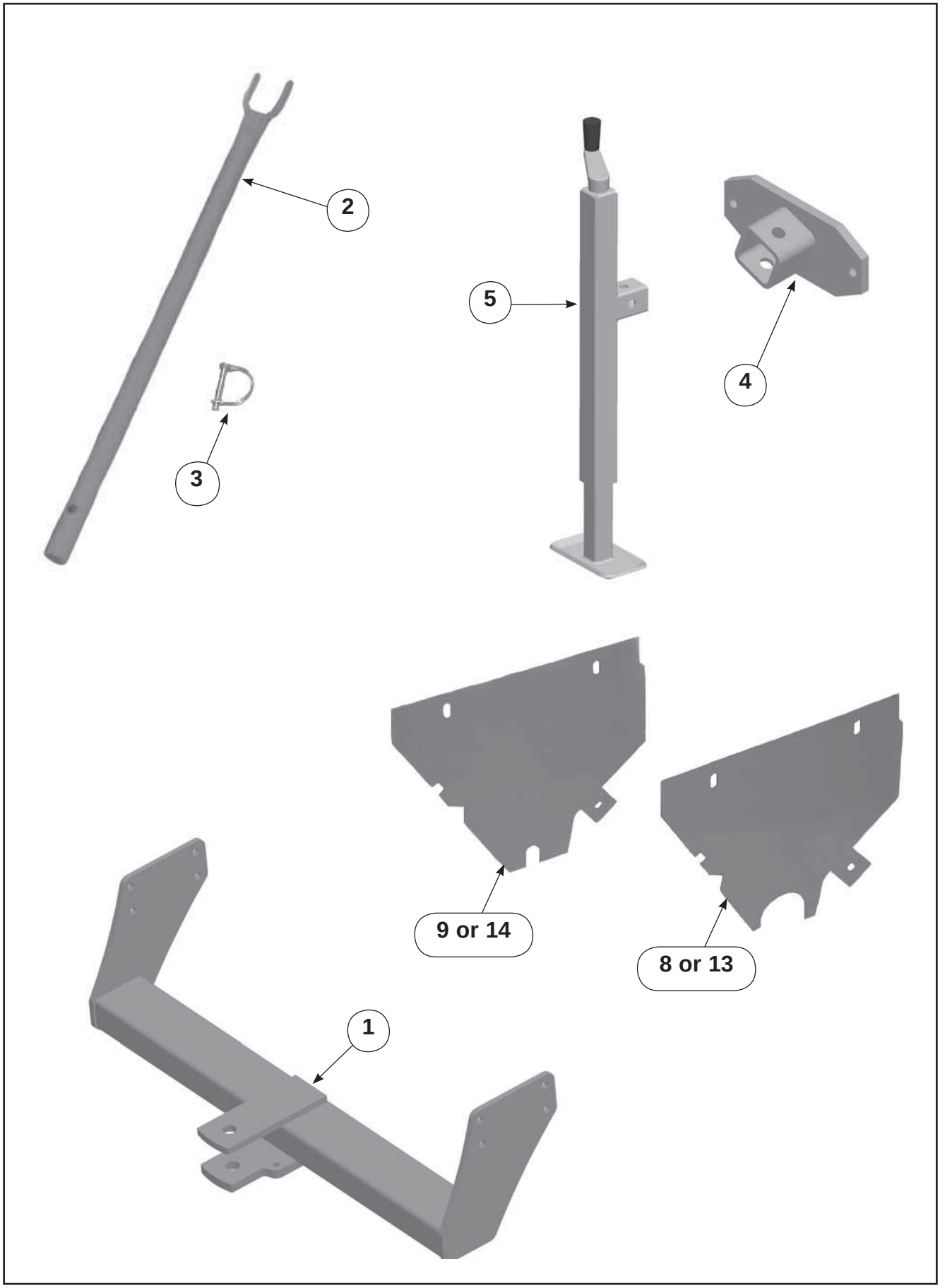

Note both lights viewed from lens side
Marker Light Fitting Outline, Viewed from lens side
Solder
Passage of wires through light fittings back plates and lamp mounting bracket
RH Light Fitting Outline, P/N 43435
Divider
Cable Colour Key
Yellow Y
White W
Green G
Red R
Brown Br
Marker Light Fitting Outline, Viewed from lens side
Cable Entry from LH Light
Fixing holes for markerlight to RH light fitting
Cable Entry from Connector Plug, through 6A Grommet and new hole
Passage of wires through light fittings back plates and lamp mounting bracket
Divider
LH Light Fitting Outline
Solder
Fixing holes for markerlight to LH light fitting
Divider
Cable Entry From RH Light
6
Lighting supply cable (End Details) P/N 22960
5
5 mm Ensure outer casing of cable protrudes past cable clampby at least 5 mm
Terminals viewed from direction of cable entry
Slide rubber sleeve along cable before starting to wire up terminals
Seven Pole Plug P/N 43437
Cable Colour
Terminal Number
Yellow 1
White 3
Green 4
Red 6
Brown 7

‘Renovator Classic’ (Optional) Wiring & Lighting

ITEM	PART No.	DESCRIPTION	QTY
1	25913K	Complete Lamp Kit, 15 Run	1
2	25915K	Complete Lamp Kit, 19 Run	1
3	24228	Lamp Bracket Assembly L.H.	1
4	24227	Lamp Bracket Assembly R.H.	1
5	43435	Combination Rear Lamp	2
6	43436	Marker Lamp	2
7	43438	Flex, 5 Core Trailer (15 Run x 9.3m, 19 Run x 10.0m)	1
8	43443	Wire, Appliance, White 1mm x 1m	1
9	43444	Wire, Appliance, Brown 1mm x 1m	1
10	45136	Nut, Nyloc, M6	4
11	45137	Nut, M8 Nylock	4
12	45399	Bolt, M8 x 30 Class 4.6 Zinc Plated	4
13	45403S	Set Screw, M6 x 25	4
14	45860	Screw, No. 12 x 3/4” Pan PZ Zinc Plated Self Tapping	4
15		Bulb, 5W Festoon 15 x 44mm	4
16		Bulb, 21W Festoon 15 x 44mm	4

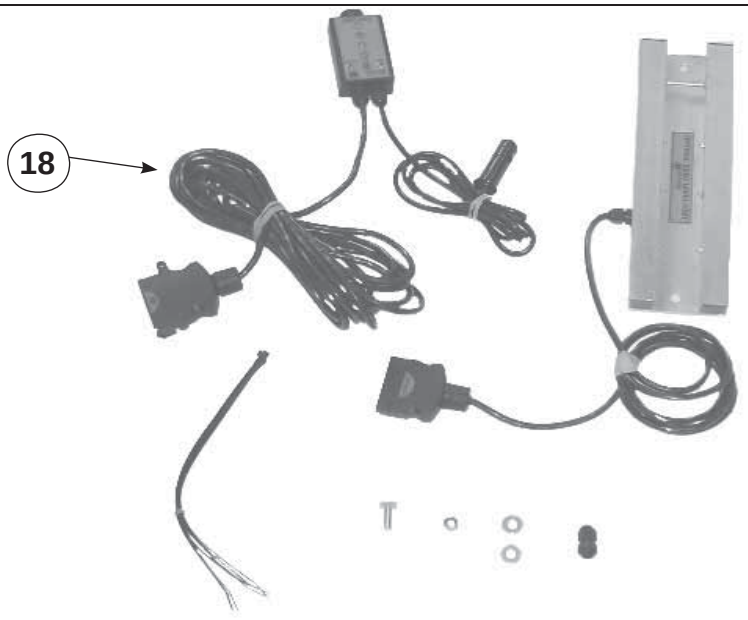


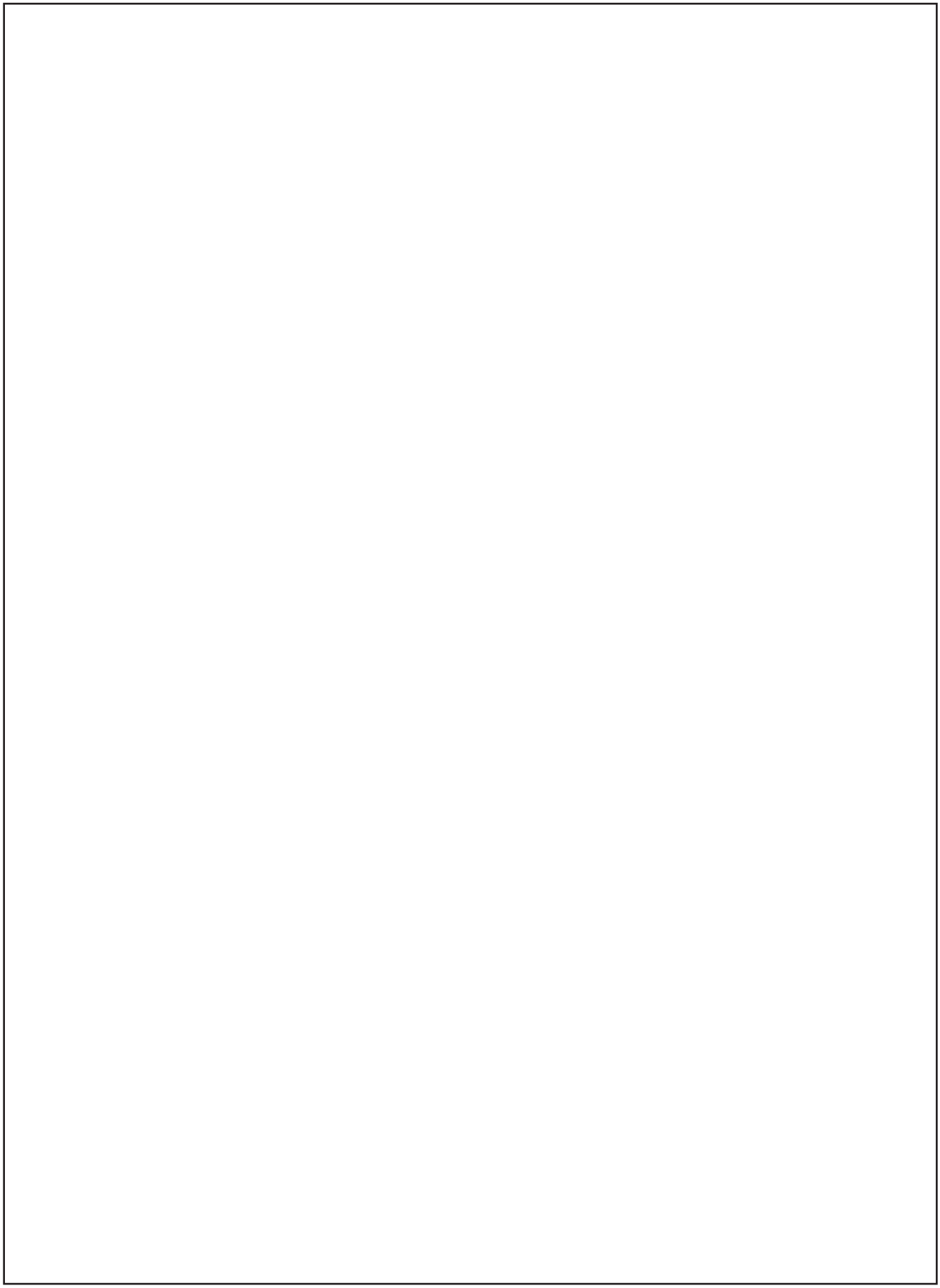
‘Renovator Classic’ Optional Extras



‘Renovator Classic’ Optional Extras

ITEM	PART No.	DESCRIPTION	QTY
1	26795	Rear Tow Hitch Assembly	1
	26852k	Harrow Transport Kit (Items 2 to 3)	
2	26003	Harrow Transport Support Assembly	4
3	19199	Shaft Locking Pin	4
	26850k	Jack Stand Kit (Items 4 to 7)	
4	26809	Jack Support Bracket	1
5	31478	Jack	1
6	45034	M12x130mm Grade 8.8 Bolt (Not shown)	2
7	45139	M12 Nyloc Nut (Not shown)	2
	26856k	Baffle Extension Kit (Items 8 to 12)	1 kit/box
8	26855	Box Baffle Extension (Seeder Centre)	1
9	24250	Box Baffle Extension	2
10	45410S	M8x16 Bolt (Not shown)	9
11	45137	M8 Nyloc (Not shown)	9
12	*45151*	*M8 Light Flat Washer (Not shown)*	12
	26856SSk	Baffle Extension Kit Stainless (Items 13 to 17)	1 kit/box
13	26855SS	Box Baffle Extension SS (Seeder Centre)	1
14	24250SS	Box Baffle Extension SS	2
15	45410SSS	M8x16 Stainless Steel Bolt (Not shown)	9
16	45137SS	M8 Stainless Steel Nyloc (Not shown)	9
17	45151SS	M8 SS Light Flat Washer (Not shown)	12
18	26858k	Optical Seed Level Indicator	1





DUNCAN AG

CEproof

CEproof International Limited
Hilliard House
Lester Way
Wallingford
Oxfordshire OX10 9TA
UNITED KINGDOM

EC DECLARATION OF CONFORMITY

Description of Machine: *Agricultural Seed Drill Machine*

Make / Model: *Duncan Mk3 Renovator & Classic Renovator*

Type: *19R & 23R Disc Opener*

Serial Numbers:

Mk3 Renovator *CPAC to CPDC 000001-100000*
CQAC to CQDC 000001-100000
C319DO 000001-100000
C323DO 000001-100000

Classic Renovator *CFAC to CFDC 00001-10000*
C/RCDO 00001-10000

Name of Manufacturer: **CLOUGH AGRICULTURE LTD**

Address: **100 Hilton Highway**
Washdyke
Timaru 7910
New Zealand

We hereby declare that the product described above complies with the relevant provisions of the appropriate EC Directives and Harmonised Standards of the European Union listed below and accordingly carries CE-marking.

Machinery Directive 98/37/EC

The following Standards are applicable:

- *EN 294 : 1992*
- *BS EN 982: 1996*
- *BS 1841-1:1996 / ISO 730-1: 1994*
- *BS 5499-1: 2002*
- *EN ISO 12100-2 2003*

Date of Declaration: 1st December 2008 ***Date of Issue***: 18th November 2010

Craig McIsaac
Managing Director
Clough Agriculture Ltd

Neil Spencer
CEproof Directives Ltd
Keeper of technical documentation in the European Union

CE

NZCE 089: CPI 08 rev3 21/11/2010